SPRING 1983

NAVY CIVIL Engineer

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Wave action destroying our beaches? — page 22

Women in CEC at all-time high — Five recent recruits tell why on page 2

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THE COVER

The four young ladies pictured on the cover were captured on film by Navy photographer A. A. Mitchell as they hurried up the famed staircase of the Naval School to attend an important class. The five women in their basic class (one was not available for the photo) represent 12½ percent of the total number of women in the CEC today. All are educated, intelligent, personable and all are engineers. What are their hopes and dreams and why did they join the Navy? Find out on page 2.

Navy Civil Engineer

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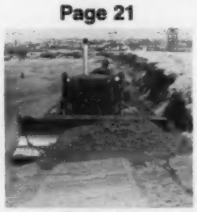

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WOMEN in the CEC

By BILLYE GRYMWADE
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Photography and Cover Photo

The number of women who are finding careers in the Civil Engineer Corps is on the increase — from one to 40 in the past 10 years. How do these women feel about entering what was formerly considered to be a "man's field"? Five recent graduates from basic training gave their answers.

• Port Hueneme, Calif.

More and more women are carving out careers for themselves in the Civil Engineer Corps. Beginning with the first woman to join in February 1973, Jeri M. Rigoulot, the figure has grown to 40 in 1983, or two percent of the total 1,455 personnel in the CEC.

The increase has been a steady one: from one in 1973; to five in 1975; seven in 1977; 12 in 1979; to 40 in 1983. Will this trend continue? Will these women stay in the Corps the way LCDR Rigoulot has? She is now assigned to the Public Works Center in San Francisco, Calif.

What do we know about women in the Civil Engineer Corps of the U.S. Navy?

What are their backgrounds? What are their hopes? And why did they come into the Navy? These and other questions are answered by five women from the Basic CEC Officers Course No. 166 of the Naval School, Civil Engineer Corps Officers (CECOS), Port Hueneme, Calif., graduating March 4, 1983.

ENS Cynthia Bishop

Ens Cynthia Bishop, CEC, USNR, of Denver, Colo., came into the Navy because she wanted to work overseas and because she wanted to get into engineering management. The Navy seemed like a good opportunity for both.

At the University of Colorado, Ens Bishop earned the Ketchum Award for the outstanding graduating civil engineer. She also won the Outstanding Junior Engineering Award, which led to a scholarship, as well as the Outstanding Sophomore Engineering

Award, which also led to a scholarship. She is a member of Tau Beta Pi, honorary engineering society.

Ens Bishop chose civil engineering for a career because she enjoyed math. There was not much she could do with a math degree, so she chose civil engineering as an overview of different kinds of engineering available. She liked civil engineering most of all because it is "bits and pieces of everything." She reports that she has been treated as an equal in her experiences as a woman in a "man's field," civil engineering.

Ens Bishop has not decided whether or not to stay in the Navy. She will wait to see what the next four years bring. She likes the Navy although she has been in only eight months. Most of that time has been spent in training.

Fleet Activities, Yokosuka, Japan, is the first duty station for Ens Bishop upon completion of the course at CECOS. She hopes some day to be stationed in Australia and in Italy.

ENS Paula Dunn

After living in Asia for seven years, Ens Paula Dunn, CEC, USNR would like to see the other side of the world. For her overseas duty in the Navy, she would like to go to Europe. Her hometown of record is Santa Barbara, Calif., and she has a bachelor of science degree in civil engineering from the University of the Pacific at Stockton, Calif. She received honors at entrance (graduated at the top of her class in high school) and graduated from the university with honors.

As a child, Ens Dunn had a good family friend in the Navy, Captain Roy Stoddard, USN. He was responsible for her joining the Navy. "The best decision I ever made," she said.

The math and science background is strong for Ens Dunn's reason for choosing civil engineering as a career. She wants to go into management, and she likes the engineering way of thinking. The only difficulty she has experienced in a man's field is being accepted as an engineer in a job in the civilian world. "It is not a problem in the Navy—they seem to accept you more readily," she explained.

There is a good possibility that Ens Dunn will stay in the Navy. She plans to get her master's degree while in the Navy, and that will take at least six years. She joined the Navy one year ago with the CEC Collegiate Program.

Upon graduating from CECOS, Ens Dunn will be an Assistant Resident Officer in Charge of Construction at Chesapeake Division, NAVFAC, Washington, D.C.

Continued on Page 4

ENS Paula Dunn sights in on the target during weapons familiarization and marksmanship training as part of basic training.

ENS Sheila Hixenbaugh goes over the fine points.

ENS Cynthia Bishop discusses geography to the class.

ENS Penny Newcomb "hits the books" before a stiff exam.

ENS Jeanne Geisel

Originally from Harrisburg, Penn., Ens Jeanne Geisel, CEC, USNR, has been in the Navy for one year. She had some interviews with private firms before coming into the Navy, and when she talked to the Navy recruiter she was impressed that Navy was more than a 9 to 5 job. Navy seems interested in more than how you perform. It is interested in your physical fitness, for example, and all aspects of your life. She thought it would be a good experience and that she would get to travel. "I'm not ready to settle in one place," she said. "I owe something to my country for the privilege of living here."

Ens Geisel chose engineering in general at Penn State because she has always been interested in math and science. It is a chance to use her skills that way. Her degree is in architectural engineering because of her interest in buildings. She is a member of Tau Beta Pi.

Asked how she likes the Navy so far, she said she is very impressed and very enthusiastic. She has met many nice people who are open and honest and willing to help you with problems. She has done things she never did before. At Newport, R.I., she went sailing and deep-sea fishing; Gulfport, Miss., is a different culture; and California is still another life style.

Ens Geisel has had no specific difficult experience as a woman in a man's field, but she has observed apprehension on the part of some males. "They see you as a woman rather than as a professional or as an engineer," she said.

When Ens Geisel talked to the Navy detailer, she told him she wanted to go into the Seabees, but there are no women in the battalions. Congress will have to change that by law. She is looking forward to going to CBC Gulfport, Miss., for her next duty station because there will be some contact with the Seabees. That is the closest exposure she can have for now. She is keeping an open mind about staying in the Navy.

Other hopes for the future include her desire to be stationed in Iceland, the Philippines and Europe.

ENS Sheila Hixenbaugh

She worked for a firm in Honolulu (her home town), at a middle management level where there was a lot of talk about management skills, but management remained in the hands of the partners. Consequently, Ens Sheila Hixenbaugh, CEC, USN, came into the Navy for management experience.

At the University of Hawaii, where she earned a bachelor's degree of fine arts in architecture and a master's of architecture, she received three design awards. She was president of the student chapter of A.I.A. She is also a Registered Architect in Hawaii.

When asked how she liked the Navy, Ens Hixenbaugh exclaimed, "I love it! I have had a fantastic time! Everybody is positive about his work and where he is going. It is really enjoyable to be around people like that." She has been in the Navy for 11 months.

Ens Hixenbaugh's parents were against architecture as a choice for a career, and there is some resistance in

architecture because she is a woman. One woman can spoil it for the others. "If one woman is silly, then all women are lumped together, and stereotyping is the result," she said.

Ens Hixenbaugh does not know yet whether or not she will stay in the Navy. It will depend on what the Navy is like.

Egypt, Kenya, Crete, Greece, Italy, Spain and England are some of the places where Ens Hixenbaugh would like to be stationed while she is in the Navy. Her next duty assignment will be at the Naval Station, Guantanamo Bay, Cuba.

ENS Penny Newcomb

Ens Penny Newcomb, CEC, USNR, comes from a Navy family—her father, Capt. Frank M. Newcomb, CEC, USN, is now retired. Because of her exposure to the Navy all her life, she was aware of what the Navy has to offer. She had worked in private industry, for a commercial architectural firm, which did not satisfy her needs. "Navy appears to be a better route to take in terms of professional development as an architect," she said.

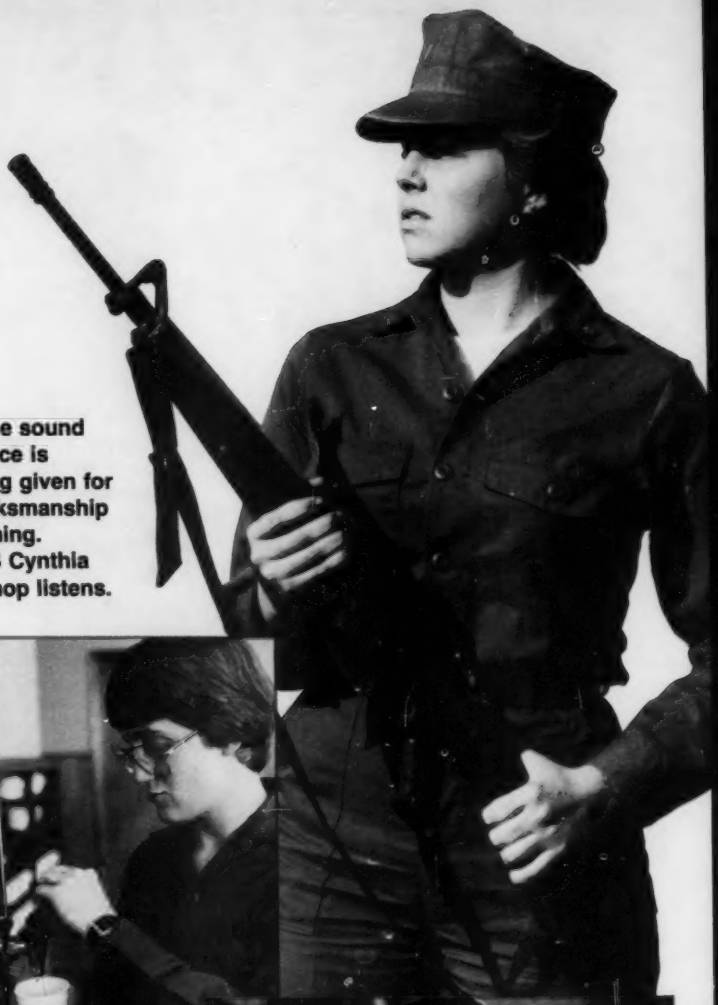
Ens Newcomb is not sure if she will make a career of the Navy, however. She will see how things develop. So far, after five months, she reports that she has enjoyed the Navy immensely.

As a student at Virginia Polytechnic Institute, where Ens Newcomb earned a bachelor's degree in architecture, she was active in student government. She was a senator for student government, and she was president of the A.I.A. student chapter. She chose architecture for the design aspects and the creativity—not for the money!

One of the many reasons Ens Newcomb left private industry was because of the difficulties encountered as a woman in a man's field and trying to gain the necessary experience for professional registration. There were roadblocks toward gaining this experience. "Men experienced some of the same roadblocks," she said, "but they were more so for women." She added, "The Navy assures you of more opportunity for equal coverage in terms of experience and advancement."

Growing up in the Navy and moving around so much, Ens Newcomb was hard pressed to name a hometown. She selected Alexandria, Va., where she has worked for the past two years. She has been on the east coast a long time and would like to go to Hawaii on a future tour. She would consider an overseas billet.

Her first duty assignment after CECOS is as an Assistant Resident Officer in Charge of Construction, Western Division Contracts, Naval Air Station, Point Mugu, Calif. □



Some sound advice is being given for marksmanship training. ENS Cynthia Bishop listens.

What could be better after a hard day of hitting the books and marksmanship training, than a cup of good Navy coffee. At least ENS Jeanne Geisel thinks so!

All is not work for new recruits in basic training. The class takes time out for a good old fashioned baseball game. ENS Jeanne Geisel takes a turn at catching.

Facilities Hazards

What is being done to eliminate them?

By GARY T. STAFFO
Director, Safety and Health
NAVFAC
• Alexandria, Va.

Each year the military services generate a substantial workload of plans and specifications for new facilities and modifications or renovations to old facilities. The types of facilities for which projects with accompanying plans and specifications are prepared range from standard administrative and housing facilities to the specialized and unique industrial and operational facilities such as plating shops, hush houses and hyperbaric facilities.

These facilities projects present a tremendous challenge to planners and designers in terms of assuring hazards are not built in. The challenge lies in the fact that potential hazardous conditions to personnel safety and health exist anywhere there is energy or potential energy.

The people who are probably the most knowledgeable about the potential hazards of a certain type facility are not the planners and designers but the activity safety and health professional who has inspected this type of facility for years, has investigated the mishaps which have occurred within it, and developed and consulted with the operating personnel on corrective measures to eliminate these hazards.

The secret to eliminating hazards in facilities is to get the activity safety and health professionals knowledge inside the heads of the planners and designers.

Historically our approach to addressing hazards has been that of establishing requirements through codes and standards in an attempt to mandate hazard elimination or abatement through accepted common controls or practices, after the hazard had been identified and a data base developed to support such standard.

The standards that used to fill books now fill bookshelves and still do not address all hazards. New hazards and old hazards in a different form are created very often by changes, assumptions, new materials, new procedures, new combinations and new uses to name a few general sources.

There is also a substantial problem in not learning from our mistakes and experience. This problem has several factors to it, with the lack of detailed investigations of mishaps by safety and health professionals being a primary factor.

When mishaps are not investigated by safety and health professionals in a detailed and thorough manner the contributing causal factors to a mishap, many of which may be design related, are not identified.

The fact is that, because of limited resources, most Navy safety and health offices are relying upon the supervisors to do most of the mishap investigations with only the serious mishaps receiving attention by safety and health professionals.

Safety and health professionals can provide information about potential hazards and mishap experience data.

The lack of use of advanced mishap investigation techniques such as change analysis, events and causal factors charting, and energy trace and barrier analysis as contained in the Management Oversight and Risk Tree (*MORT Safety Assurance Systems*, National Safety Council, Wm. G. Johnson, 1980) method is another reason contributing causal factors are overlooked.

Compared to the method used for informal Judge Advocate General (JAG) investigations, which is used by many Navy safety and health offices as the basic guide to investigation of serious mishaps, it is the author's opinion that MORT provides a more thorough, useful, and comprehensive report in a significantly more efficient manner. In summary MORT provides a better product for less resources.

Another factor in our inability to learn from our mistakes is that there is very little feedback of safety and health design deficiencies from field activities to NAVFAC engineering field divisions (EFDs) and NAVFAC Headquarters where planning, design, and construction is our major concern.

Part of this communication problem is due to the lack of a formal system to collect, channel and analyze this information for appropriate corrective action. These are some of the reasons why the traditional codes and standards approach to facilities hazards is giving way to system safety in select applications. More about this topic will be discussed later.

Keeping these items in mind let's find out a little more about how facilities projects are developed, the constraints inherent to the facilities acquisition process, and what NAVFAC as one of the Department of Defense authorized construction agents (the U. S. Army Corps of Engineers is the other) is doing to minimize built-in hazards.

Facilities projects start at the activity level based upon mission and identified needs. The activity Public Works Officer (PWO) is the focal point where needs start becoming reality. All safety and health offices should have a good, established working relationship with the PWO. This relationship is necessary so that safety and health professionals can participate during the planning and design phases of the facility acquisition process.

Participation at these phases is crucial and is the point where the highest payback can be obtained. Review of plans and specifications is for the most part the last opportunity to avoid hazards before construction. If hazards are discovered during construction it may be possible to issue change orders to correct them, but this is an expensive and time delaying procedure.

As new projects are developed or old ones updated by the PWO, the safety and health professional can provide information about potential hazards and mishap experience data.

The ideal input from the safety and health professional would be a preliminary hazard analysis (PHA) based upon the general hazards posed by that facility type. NAVFACINST 11010.32F of 12 May 1980 requires this hazard documentation to be included in each facility study.

Most projects are designed by architectural — engineering (A-E) firms based upon a scope of work prepared by the activity and the cognizant NAVFAC EFD.

The hazard documentation provides a basis for the scope of the safety and health design efforts for the project. NAVFAC, in an attempt to improve upon the traditional codes and standards approach, is developing system safety engineering and management techniques for use on select projects based upon an assessment of their overall hazard potential.

The NAVFAC system safety engineering and management effort is contained in Section 3 of enclosure (1) to NAVFACINST 5100.11D of 5 June 1981.

It is important to note that this effort is one of the first in the federal and private sector to apply system safety to facilities other than nuclear, and explosive facilities. Thus, very few A-E firms have any experience or expertise in system safety applications to the facilities acquisition process.

Other considerations that must be kept in mind are that most projects take 3-5 years to go from planning to actual construction, and congressional restrictions limit design costs to 6% of the construction cost.

Another constraint inherent to the facilities acquisition process is that, unlike weapon systems where an integrating contractor is usually available throughout the lifecycle of the system (cradle to grave), facilities have different players at different phases of the process.

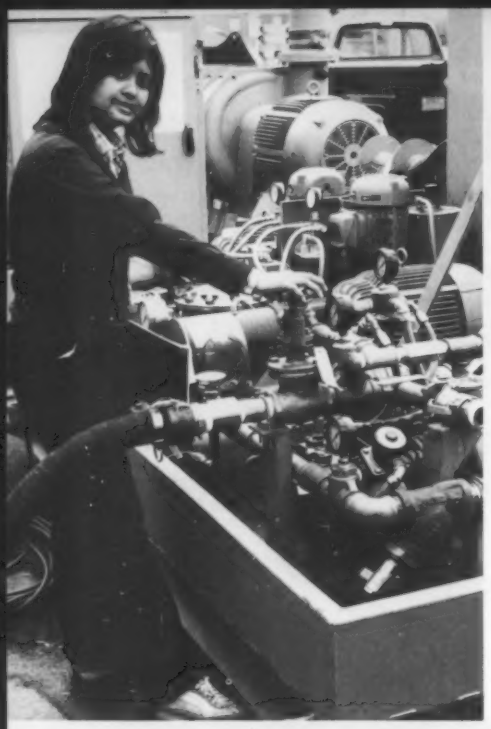
There is a tremendous challenge to planners and designers of facilities projects to assure that hazards are not built in

As discussed earlier, this tends to allow for breaks in communication and feedback with resulting deficiencies. More detailed information about problems with the current facilities acquisition process and thoughts on the system safety approach are contained in "Providing for Safety in Federal Facilities" which is Chapter 9 from the *Transactions of the Federal Construction Council for 1978-79*, published by the National Academy of Sciences, BRAB-FCC Commission on Sociotechnical Services for the National Research Council.

NAVFAC and the U.S. Army Corps of Engineers are working together with the Joint Services Safety Conference (JSSC) System Safety Panel to develop realistic approaches of applying system safety within the facilities acquisition process.

Until these efforts are completed and implemented, the activity safety and health professionals can have a significant impact on reducing facilities hazards.

Based upon past experience, historical data and analysis the safety and health professional can identify hazards to the activity PWO prior to and during the planning and design phases. This information and its use by the PWO for project development and support is one of the keys to safe and healthful facilities. □



Engineering Technician Liza Montefalcon helps in the demonstration of the flow path of the citric acid solution through the pump module. The pump was developed by NCEL.

Citric acid speeds cleaning of ships prior to repair

By JERRY THOMAS

• Port Hueneme, Calif.

The Navy has approximately 500 ships, ranging from aircraft carriers to harbor tugs. To maintain maximum duty-station readiness, each ship must undergo periodic maintenance and repair, either pierside or in drydock.

Frequently, an important segment of a ship's repair time is set aside to completely clean, restore and preserve steel surfaces normally exposed to severe corrosion.

In 1975, one of the Navy's major shipyards began experimenting with a citric acid solution to remove rust from ship tanks and bilges in preparation for surface coating (preservation) with epoxy paints. The new process attracted interest at two other yards. It began to replace the environmentally-limited sandblasting method for bilge treatment. Chemical removal of scale, and iron rust from surfaces is a more thorough process than sandblasting. Shipyard workers report that ships cleaned with citric acid require considerably less cleaning and painting of such spaces during the next overhaul or maintenance availablity.

The Navy insists the bilge and tank surfaces be cleaned and recoated as quickly as possible to minimize interference with other maintenance trades during overhaul.

The Naval Civil Engineering Laboratory (NCEL) has further developed the application of the evolving citric acid process by designing and fabricating a self-contained modular system to clean and protect fuel, water and ballast tanks, along with bilges, shaft alleys, and voids. This system gives the Navy its first operational capability to independently clean critical shipboard surfaces with citric acid in preparation for recoating.

Operational tests are scheduled this year at Puget Sound Naval Shipyard, Bremerton, Wash., on NCEL's prototype Shipboard Tank and Bilge Chemical and Processing System (STABCHAPS). The portable package consists of a tank module to prepare, heat and circulate chemical solutions; a pump module to transfer solutions aboard ship to the tanks and spaces at two pressure levels, 100 psi and 2,000 psi; a vacuum module to remove solutions from decks of tanks and spaces with hoses similar to a household vacuum; and a filter module to separate unwanted solids (paint chips, rust flakes, sand) and to recycle the filtered solution back into the system through the tank module for reheating and recycling.

Adolph Bialecki, NCEL research chemical engineer and STABCHAPS project coordinator, said the total package can be accommodated with a 400-square-foot work area. It can be transported to various work locations such as drydocks, piers, barges and hangar decks of aircraft carriers. The system's flexibility enables it to perform any combination of phases in the citric cleaning process.

Bialecki said Naval Shipyards at Long Beach, Calif., Pearl Harbor, Hawaii, and Norfolk, Virginia, have been leasing commercial equipment to implement the process. Norfolk has improved the hardware by redisigning and fabricating its own system which provides additional capabilities to handle more ships.

When operational tests of various STABCHAPS modules are completed, the system will be integrated as standard equipment with existing shipyard clean/recoat operations.

NCEL's design and construction of the system were sponsored by the Naval Sea Systems Command through the commander, Naval Air Force, Pacific Fleet (COMNAVAIRPAC). Bids of approximately $2 million from commercial contractors were considerably above the sponsor's budgetary range. The Laboratory performed the task for one-fourth of the proposed commercial estimate, or a savings of $1.5 million to the Navy. With $550,000 in funds from COMNAVAIRPAC, the laboratroy designed, built and tested a prototype system for an aircraft carrier.

The three shipyards employ the same basic operations to remove scale and rust with citric acid from corroded metal surfaces in bilges. Although the yards agree that the process is successful and superior to sandblasting, certain methodological differences can be found. These are primarily in the manner of applying the chemical solution and in the formulations employed during citric acid spraying and preservation stages prior to epoxy coating application.

Six general phases are involved in surface preparation and coating. They are cleaning/degreasing of spaces; stripping of old paint, scale, and flaky rust; application of hot pressurized citric acid spray to derust surfaces down to bare metal; application of hot passivating solution spray to prevent flash rusting; drying of surfaces; and surface preservation with special Navy protective epoxy coatings.

The selection of the milder citric acid over corrosive hydrochloric acid as the preferred cleaning solution was determined in 1979 after an NCEL engineering study of both agents.

Seven of 10 tanks examined were coated with alkyd which can be removed by commercial alkaline strippers as part of the STABCHAPS method. Lab chemists, however, have recommended the use of a lye solution with detergent as more cost effective than commercial products.

The Laboratory examined the problem of passivation (prevention of flash rusting). It found that the best method is to rinse the steel surface with a dilute mixture of a mild organic alkali in water. When the water evaporates a no-rust protective alkaline glaze remains on the surface.

There are several major advantages of the citric acid procedure over conventional hand, mechanical and sandblasting techniques. Although sandblasting provided an adequate surface, its inherent disadvantage was that it produced a large amount of solid waste. For example, Long Beach Naval Shipyard's three drydocks were accumulating up to 9,000 tons of solid waste annually. Disposal presented a special problem in light of stringent governmental regulations concerning hazardous wastes.

One of the prime advantages of STABCHAPS is its automated spraying system that automatically cleans and derusts tanks. A series of 12-18 nozzles, spraying citric acid at 160°F, will clean the rust off the four bulkheads, beams, and overhead in about two hours. In contrast, it will take workers approximately 12 hours to clean an average tank with hand-held spray devices.

STABCHAPS is so versatile that it can even clean and derust the peaking tank, the most inaccessible space in an aircraft carrier. This capability, in fact, was a primary design goal of the system.

Accordingly, STABCHAPS will reduce dramatically the manpower needed to clean and resurface tanks and will minimize worker exposure to the hazardous environment (heat and fumes).

Another disadvantage of sandblasting occurred in bilges and spaces containing fixed machinery with gaskets, shafts, bearings, and brushes. The air quickly became contaminated by sand and dust. However, citric acid spraying removes metal oxides without damaging sensitive machine parts and without generating large volumes of waste. The hot, mild acid solution is recirculated through the tanks, dissolving the surface rust, and subsequently is transferred into dockside waste tanks for future reclamation.

Federal regulations require special masks for personnel, even those outside immediate sandblasting areas.

The citric acid solution, however, is safe to handle, being especially low in toxicity. It reeks no harsh vapors and has low corrosivity toward bare metal.

Another advantage of using STABCHAPS is that this procedure permits automated treatment of previously inaccessible tanks and voids.

In proving that citric acid performs satisfactorily, the shipyards have overcome operational and technical difficulties. Accordingly, each is releasing ships from drydock in better states of preservation than ever.

Bialecki said that diligent record-keeping of surfaces treated with citric acid during the next few years will verify the improvement, upon comparison with other cleaning methods.

The addition of NCEL's STABCHAPS system to existing cleaning and coating procedures will further improve the effectiveness of citric acid application. Cost savings are expected to increase as more ships undergo the new treatment. □

advice of counsel

departments

ADVICE OF COUNSEL
By WILLIAM H. SPECK
NAVFAC HQ

". . .when a man knows he is to be hanged in a fortnight, it concentrates his mind wonderfully." S. Johnson

Standards of Conduct enforcements can be trivialized — whether to attend a contractor-hosted reception after a training course, whether a defense-firm emblazoned desk calendar may be accepted. But violations by contractors or government personnel may have extremely serious consequences for the private firms and the government personnel involved.

The press reports collusions to fix pavement bids both on the East Coast and in the Midwest, and our Atlantic Division has collected damages from pavement subcontractors. Estimates of actual damages are tripled to determine reimbursement to the Goverment.

A Washington area research firm pleaded guilty to offering jobs and bonuses to procurement officers in return for inside information and help in obtaining contracts. The firm was fined $10,000 on each of three counts ($30,000) and has been struggling to avoid debarment from all defense work.

A contractor making gifts to a government employee with view to influencing contract handling subjects the contract to cancellation under the Gratuities clause. And even if Gratuities action is hard to start, NAVFAC has terminated such contracts for anticipatory breach. Contractors have lost their contracts and been obliged to repay bribes received.

For the employees concerned the penalties may also be severe, for example in actual cases: removal for first-offense acceptance of a bottle of whiskey; a $64 golf outing and reception may justify discharge; acceptance half a case of liquor at Christmas justified discharge; 90 days loss of pay for allowing use of government car by employees family. A many-times larger number of government employees incurred less severe penalties and did not litigate.

Thus, standards violations may result in devastating penalties for both the private party and the government employee. And the penalties are only the end result of a long, expensive and humiliating procedure of charges, reviews, appeals, and litigation, during which both contract and the employee's work are halted or severely handicapped. □

Maintenance Management

... a return to basics

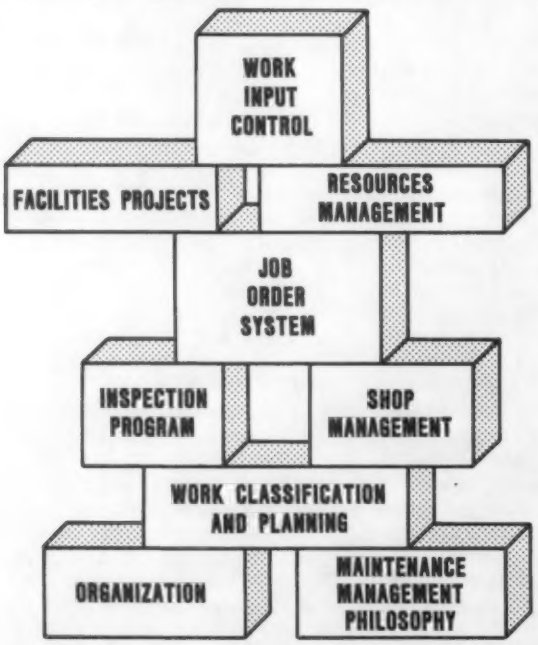
By LCDR GERARD JUDE BARRETT
P.E., Guam and Pa.

• Saudi Arabia

In our rush to improve the way we perform and manage our work, it's easy to overlook the fundamental concepts on which our maintenance management system thrives. We set up elaborate ancillary systems and staffs to estimate, order materials and track them, schedule and perform our work. We collect data on our efforts, analyze how well we do it and congratulate ourselves on our use of the latest tools and information systems that modern technology offers.

Yet a gradual but continual deterioration occurs in real property assets. You see your locally funded maintenace backlog growing, your special projects program going out of sight, and Navy-wide an astronomical problem which must be contained. Why are we faced with this problem?

Figure 1. An independent integrated system.



Each one of us has seen the problem and in many respects has dealt with it to a degree. Often in our desire to do a good job, and to make immediate impressions we have only considered the short, near term, or "more significant" problems and the consequences of our actions.

We look after the Commanding Officer and his pet projects, the minor construction operational related needs, the child care center expansion, the new MCON submission deadlines, the OSHA survey fallout, the equipment on deadline, why the emergency generator keeps dropping the communication load, those reports due to the EFD, the compressor reorder for the Computer Center HVAC System, etc. You name it, and if you have ever been assigned to Public Works, then you had to deal with it.

From this author's viewpoint, this awesome responsibility and the desire to cover as best we can the many "challenges" facing us, overshadow the very reason for the existence of Public Works Departments. After all, as the saying goes, it is hard to remember that you are there to drain the swamp when occupied with other "more important" matters, or something similar to it.

Facilities Maintenance Management

Just what are we to do and how are we best to do it to fulfill our responsibilities as Civil Engineer Corps officers. We in facilities maintenance management must provide that level of effort necessary to ensure that the "fleet" or its elements are prepared to carry out its basic mission. To do this we must optimize the use of our available resources to provide:

A Proper Level of Maintenance to all Facilities
Effective Control of Our Work Force
Effective Control of Maintenance Costs
Timely Response to Command Facilities Requirements

To accomplish our basic mission in the most cost effective manner, through the years we developed an interdependent integrated system which we refer to as Maintenance Management (Figure 1). It is a building block system whose elements we perform very well, as well as take on those additional taskings which for the most part must be done, and which are very germane to our support role. However, we often overlook the criticality of one component of this system and the concepts on which it is based.

You've all seen the results of poor performance of this component, be it in the gradual deterioration of our overall plant account, or in the inability of our dynamic/life and mission systems to function properly.

A great deal of money is being spent to replace or upgrade our facilities, but unless we recognize the role of this component and the early recognition of its associated problems history will repeat itself. What is this component?

Continuous Inspection Program

It's the Facilities Continuous Inspection Program. It is just one element of the Controlled Maintenance Concept. It is the most critical because it supports the entire Controlled Maintenance Structure (Figure 2). Its purpose is to identify deficiencies in all existing facilities and their associated systems in order to maintain a "proper level of maintenance."

The program itself has three subelements (Figure 3) all of equal importance if our overall concept of Maintenance Management is to succeed.

The first is Control Inspection. It principally entails the periodic examination of all facilities, associated equipment and supporting utilities to locate substandard conditions, and to take corrective action, and consequently ensure maintenance in the lowest, most cost effective manner through improved planning and utilization of all Facilities Operations and Maintenance (FACOM) resources, i.e. equipment, material and manpower.

The second is Preventive Maintenance Inspection which for the most part is usualy mission critical, although not limited to it, and can be easily justified. It provides for the systematic and periodic examination, lubrication, minor adjustment and repair of dynamic equipment and systems for which we in Facilities Operations and Maintenance (FACOM) are responsible. It ensures that the Computer Center, Communication Center or Hospital HVAC systems, the fire and alarm, emergency or standby electrical generation systems, etc., are kept in continuous service, or are ready for service. Badly serviced equipment leads to poor mission support, spiraling maintenance costs, and least but not last a poor FACOM image.

Figure 2. Controlled maintenance structure.

Figure 3. Facilities maintenance.

The last element is Operator Inspection. It covers systems attended by an operator for essential operation and are primarily concerned with those systems which, if disabled, would interfere with the essential operation of the activity, endanger life or property, or involve a high cost or long lead time replacement. Its emphasis is on operator inspection, lubrication, minor adjustment repair of equipment and systems for which he/she is responsible, and the reporting of deficiencies beyond his/her capacity or authority to correct.

Exigent Inspection

Just as facilities projects are exigent in support of base mission, inspection is "exigent" for our effective use of our resources in support of that same mission. I know that each one of you has at least a basic knowledge of the fundamental concepts I have discussed above. I believe that the majority of us have taken that knowledge, and the breadth and depth of our organizational effectiveness for granted. I've seen virtually nonexistent Continuous Inspection Programs (CIP) at bases where I've been, as I'm sure many of you have also, and some of you may not be as fully aware as you should be as to the effectiveness of your own program. "The full benefits of the Maintenance Management System can only be realized when the maximum amount of work results from facilities inspection."

A Challenge

With the ever occurring turnover of our personnel both officer and civilian, the constant loss of billets, staff emphasis and prior career orientation, basic programs developed before many of us were even associated with the Navy have become dormant. Let's revitalize them. Don't accept the answer, "Oh yes, of course we have a program." Get up and review your inventory of facilities and associated systems. Look at the inspection schedules and whether they were performed or not, and look at the resulting reports and records.

Remember, if you do your control inspections properly and carefully relate unfunded deficiencies to mission "capability" you'll find that compiling your Annual Inspection Summary (AIS) and preparing your budget will be quite a bit easier. □

PAVER

Paves the way at Great Lakes

By LCDR DONALD R. UZARSKI, CEC, USN
P.E., Penn. & Ill.
Facilities Planning Officer, PWC Great Lakes

• Great Lakes, Ill.

Those entrusted with the maintenance management of the vast naval shore establishment know how difficult that task is. There is always a paucity of funds to fight the battle of the ever growing list of Annual Inspection Summary (AIS) deficiencies. Since various facilities compete for the scarce funds, breakdown maintenance consumes an inordinate amount of management time and maintenance resources. Regrettably, efficient, cost effective, maintenance management becomes lost.

When managing and maintaining facility pavements (Investment Category 18), the results are especially devastating since pavements frequently receive a lower priority for maintenance resources than other facilities.

Pavement maintenance management typically consists of spending just enough money to repair potholes and, maybe, do some patching and crack filling. Then, when the station roads deteriorate enough, a special project is submitted for major repairs, usually consisting of an overlay of some given thickness.

The effects of that management philosophy are twofold. Not only is pavement serviceability lessened due to lack of maintenance, but the cost of repairs escalates rapidly as the pavement deteriorates.

Serviceability is defined as the pavement's ability to perform as intended and can be expressed in numerical terms such as a Pavement Condition Index (PCI) or in subjective terms of a condition rating. Figure 1 represents the serviceability over time (condition history) of two pavement sections, one well maintained and one not. In comparing the two, the well maintained pavement performs better over a longer period of time than the pavement which received no or poor maintenance.

Based on actual data collected at the Naval Training Center, Great Lakes, Figure 2 represents the average cost per square yard for typical maintenance/repairs versus the same Pavement Condition Index. For every ten point drop in PCI, costs double.

Happily, pavement maintenance management can be greatly improved. The technology exists for implementation of a formal pavement maintenance management system (PMMS) at two distinct but related levels — project and network. Management at both levels is necessary for a successful system.

Project level management considers cost effective maintenance/repair alternatives and schemes in the formulation of given projects.

Network level management prioritizes those projects, inventories the pavement sections, establishes budgetary needs, analyzes the current and future overall pavement condition, and projects annual inspection requirements.

Once the manager establishes minimum acceptable pavement condition standards, the management system will permit cost effective maintenance/repair schemes to be formulated for budget optimization and/or provide rational justification for projects or additional funds. The result is an improved, well maintained pavement network at lower overall cost.

Many city and state highway departments have recognized the benefits of implementing a pavement maintenance management system, and consequently, many systems have evolved. Most are generally tailored for the users' specific needs, but the Public Works Center, Great Lakes, has completed implementation of a centrally computer based PMMS called PAVER in which to manage every pavement aboard the base.

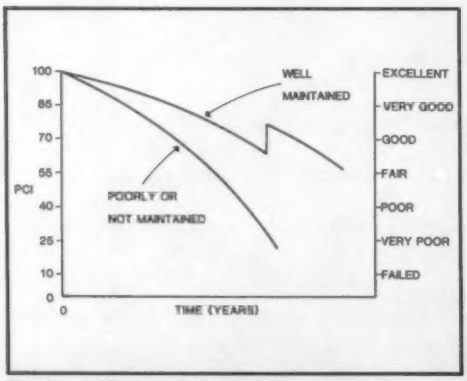


Figure 1. Pavement section condition history of two pavement sections.

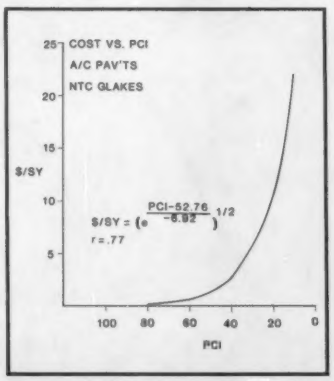


Figure 2. Maintenance/repair costs versus PCI.

PCI	RATING	MAINTENANCE / REPAIR STRATEGY
100	EXCELLENT	ROUTINE MAINTENANCE / REPAIRS
85	VERY GOOD	
70	GOOD	ROUTINE MAINTENANCE / REPAIRS, OR,
55	FAIR	MAJOR REPAIRS, OR, OVERALL RECONSTRUCTION
40	POOR	MAJOR REPAIRS, OR, OVERALL RECONSTRUCTION
25	VERY POOR	OVERALL RECONSTRUCTION
10 0	FAILED	

Figure 3. Maintenance/repair strategy with PCI and conditioning rating.

Developed by the U. S. Army Corps of Engineers for military installation application, PAVER is a new state-of-the-art system that represents several years of research, development, and field testing. Its implementation at Great Lakes is the first outside of the Army and represents the largest application to date.

Based in part by the success at Great Lakes, PAVER is being implemented by PWC San Diego. PAVER has been endorsed by the American Public Works Association (APWA) for municipality usage and several major cities are currently adopting the system.

PAVER calculates the PCI which represents a mathematical calculation that correlates within the collective subjective judgment of a group of experienced pavement engineers. The rating is based on the structural integrity and operational condition of the pavement.

Also developed by the U.S. Army Corps of Engineers, PCI is based, in part, on the Navy method for airfield pavement distress surveys. The PCI is used for many purposes. A pavement's condition over time, represents the condition history. This has been previously represented in Figure 1.

A pavement's condition at a given time, coupled with its rate of deterioration, forms a basis to indicate maintenance/repair strategy. This is displayed in Figure 3.

The total implementation of PAVER PMMS was completed on 1 September 1982 ending over 18 months of in-house and Architect and Engineer (A&E) combined effort. This seemingly long implementation period was purposely planned so that the various segments of the pavement network would be logically incorporated.

In the planning for implementation, it was quickly decided that "in-house" personnel had neither the time nor expertise to perform such an undertaking alone. Consequently, an A&E firm was selected to perform an initial thorough inspection and evaluation of all roads and streets for one of the major Great Lakes' commands.

The data collected were used to implement PAVER on a trial basis. During the implementation and post implementation periods, the facility inspectors were trained on proper inspection techniques and statistical sampling procedures.

Key personnel learned how to use the PAVER system. With the training and trial implementation completed, the inspectors and engineers began to effectively manage the incorporated pavement sections and quickly gained confidence in and enthusiasm for the system. This training and usage step was critical since, while the plan called for the A&E to do the majority of the implementation, Navy personnel are to continue with the annual inspection/evaluation process.

The final contract covered all remaining surfaced areas aboard the base. These two contracts also required that a complete pavement inspection and evaluation be performed by the A&E and that the A&E provide recommendations for pavement repairs. The contracts included provisions for limited coring and the final contract provided for nondestructive testing (NDT) to aid in the pavement evaluation and overlay design process. For this, the A&E elected to use a falling weight deflectometer.

A logistic problem that had to be resolved was how to interface with the central computer where PAVER is based. A desktop computer terminal and telephone link were needed. Initially a borrowed terminal was used, but the problem was ultimately resolved by utilizing an available micro processing desktop computer that was already in use by the facility inspectors and engineers. A software data link package and a telephone modem were obtained thereby tying the micro and central computers together.

Ray Rosendahl (left) and Robert Geerdts inspect the pavement near Headquarters Building One.

PAVER, even before complete implementation, had provided the facility managers at Great Lakes with solutions to questions that before were either impossible to obtain or would have involved extraordinary manual effort. Examples:

PAVER aids in formulating maintenance and repair strategy. A major pavement repair special project scheme was detailed and tailored to fit anticipated major claimant funding levels. This scheme involved evaluating all possible repair alternatives, section conditions, and life cycle repair costs. An optimum strategy resulted. The use of current and projected section PCIs served as an excellent justification which accompanied the projects. PAVER has also been used to develop maintenance plans for newly rehabilitated sections.

PAVER assists in budgeting. PAVER was used in the budget preparation process for computing needed funding. Also, the projected results of pavement condition degradation if budgetary relief was not provided was clearly documented.

PAVER provides centralized data. PAVER has saved numerous manhours in searching for pertinent pavement information since all available information was collected on a "one time" basis by the A&E and loaded for storage.

PAVER saves money. Its implementation has cost money, but it is believed that the costs will be quickly amortized due to savings resulting from effective management.

Please turn to the next page

Savings have resulted or will result from improved inspection procedures and intervals, fully costed maintenance and repair alternatives, cost avoidance by performing timely maintenance, less vehicle user costs, and budgetary efficiencies through optimization.

Finally, a formal pavement maintenance management system has applicability at various management levels within the Navy. Since the activity would be providing analytical rather than the usual subjective justification for budgets and projects, the major claimant can budget and program more effectively. Overall budget levels between pavements and other facilities can be rationalized since the effects of the budget level on the pavement network's condition can be projected. This same budgetary analysis can be used at all management levels throughout the Navy.

By utilizing an index such as PCI for depicting future and current conditions, the major claimant can also compare the pavements of field activities and establish priorities for programming special projects.

Such management procedures, if properly implemented, could, for the first time, permit all surfaced areas of the shore establishment to be effectively managed at all appropriate levels. The readily adaptable PAVER system can make that happen. □

technical notes

departments

Photocell on-off Lighting Control

Electric bills for many Navy activities consist of an energy charge and a demand charge. The energy charge is based on the total electrical energy used during the billing period; the demand charge is based on the peak power demand for electricity. The demand charge is a sizeable portion of the bill, sometimes exceeding the energy charge. Peak demand is often caused by heavy air conditioning loads on hot, sunny days. This is also when daylight is abundantly available to replace electrical lighting.

Automatic on-off photocell lighting controls are better for reducing peak power demand than are dimming controls. Dimming controls usually do not turn light completely off and may use as much as 40% of rated power at the minimum dimmed condition; power factor may also be lower than desired. Lights use no power when turned off by photocell on-off controls, and the control does not affect the power factor. Thus, on-off controls may be more cost effective than dimming controls even for some applications where less energy is saved. Each application must be carefully analyzed for the best trade-off among peak power demand, energy consumption and power factor.

Photocell on-off lighting controls often consist of little more than a control transformer, photocell sensor, a potentiometer for adjusting the actuating lighting level, and a relay for switching the power on and off. Passing clouds may cause the control to switch frequently, distracting occupants. Some controls compensate for this by using a time-delay; others use a deadband. The deadband is a differential lighting level feature. It allows the level for which lights are turned off to be higher than the level for which lights are turned on. For some applications it may be desireable to wire a time-clock in series with the photocell control so that lights don't come on after normal working hours.

Photocell on-off controls can be used to turn off lights when daylighting is available from:

- Open Hangar Doors. The photocell sensors can be mounted just inside the hangar, behind the door. Multiple sensors can be used along the door opening so that as the door is opened wider, more banks of lights are turned off.
- Skylights. One photocell on-off control can be wired to actuate a lighting panel controlled by lighting contactor. With this scheme, all of the electric lights near the skylights can be actuated by one photocell control.
- Windows. Daylighting through windows is affected by window orientation, external and internal obstruction, overhangs, shading devices, etc. The farther one is away from the window, the more the daylight is attenuated. These factors result in multiple controls being required to take advantage of window lighting. Generally, it is adequate to group lighting fixtures by window orientation (windows facing south, east, etc.) and by the distance of the fixtures from the window wall (fixtures within 10 feet of wall on one control, fixtures 10-20 feet from wall on another control, etc.). A rule of thumb is that useful daylight penetration is limited to 2.5 times the window height above the work plane.

There are basically two places where photocell sensors may be located:

- Room Interior. A sensor may be placed on the ceiling of a room. A location must be chosen in the room where the illumination on the sensor correlates to the illumination on the work plane; in some cases, reflections from the pavement outside the window or from venetian blinds may prevent getting an adequate correlation. A disadvantage to an interior location is that occupants can defeat the lighting control system by tampering with the sensor or by closing shading devices.
- Exterior Wall. A sensor may be placed on the exterior of the window wall. Care must be taken that the sensor does not receive excess light since many sensors are limited to a maximum of 500 foot-candles. In addition, a location must be chosen that gives a good correlation between sensor illumination and work plane illumination. These factors may make finding a suitable location difficult.

Photocell on-off lighting controls save energy by turning off the lights when daylighting is available. Photocell on-off controls are especially effective in reducing peak power demand.

Additional information may be obtained from William Pierpoint. Code L62, Naval Civil Engineering Laboratory, Port Hueneme, CA 93043; Autovon 360-4660, FTS 799-4660, Commercial (805) 982-4660. □

• Port Hueneme, Calif.

Two tours of contracts management and a stint as an instructor of service and construction contract administration, would certainly give a person an exceptional handle on the world of government procurement, I thought.

Unfortunately, after embarking on a program that could ultimately lead to the designation of a "Professional Contract Manager" (knowing full well with my background what a breeze it would be) it suddenly occured that it would take a lot more knowledge on my part — enough to fill two file cabinets.

The Point is . . .

Perhaps, after battling change orders, claims, and general paper work, you too have developed an attitude of "seen all and know all" about government procurement. Perhaps you have been naive to think that there isn't much more to contract administration than that contained in a two-week procurement course and a one-time contracts tour. A change of attitude is needed. You should tackle the following two programs.

The Air Force Institute of Technology (AFIT) in cooperation with the National Contract Management Association (NCMA) offers a program that leads to a professional designation in contract management. The primary goal is to recognize those Department of Defense employees who practice contract administration (or related field) and have through continuing education pursued the specialized knowledge necessary for effective management of government contracts.

What's the fine print?

There's good news and bad news. The good news is that the program is free. Also, upon completion a certificate will be sent to your commanding officer for presentation. The bad news is that the designation doesn't come on a silver platter. It takes time and hard work on your part to complete this program.

You must complete eight career-related courses selected from the Defense Management Education and Training Catalog and four of these courses must be AFIT sponsored. Many of the courses can be taken by correspondence through the Extension Course Institute at Gunter AFB, Ala.

In addition, NCMA-sponsored university courses and other Deparment of Defense Schools may be considered upon petition. There is a good chance that you have already completed several of the required courses and therefore be well on your way to completing the program.

Get no respect? Help is on the way!

By LT BOB PHILLIPS
P.E., Ind.
Instructor, Facilities Acquisition Division
Naval School, Civil Engineer Corps Officers

How to start

The first step is to request an application for candidacy from AFIT/LSCP, Wright-Patterson AFB, OH 45433. Upon application completion, submission, and subsequent review by the Chairman of the Professional Designation Program, you will be advised by mail of your status and the remaining courses you must complete to receive your designation.

The NCMA offers a Certified Professional Contracts Manager (CPCM) program and a Certified Associate Contracts Managers (CACM) program. Requirements for these program are as follows.

CPCM

- A Bachelor Degree
- 2 courses in procurement and contracting
- 1 course in legal
- 4 courses in procurement related areas
- 2 yrs of relevant experience
- 6 hour examination

CACM

- 60 hours of college credit or an Associate Degree
- 2 procurement/contracting courses
- 2 procurement related courses or 2 additional procurement courses
- 1 year of relevant procurement
- 3 hour examination

If you are qualified, you must complete a six-hour essay exam for the CPCM program and a three-hour (250-300 objective questions and one essay) test for the CACM program.

The CPCM exam requires applicants to answer questions on general topics in procurement and contracting during the three hour morning session and to choose and answer questions in specific areas (i.e. legal, finance, economics, accounting, logistics management, production management, or procurement and contracting) during the afternoon session.

For example, without the aid of references, could you concisely state the principal rights and obligations of parties established by the changes clause?

Some changes have been brought about by the Contract Disputes Act of 1978.

How to Apply

Applications for both certification programs can be requested by writing to the Certification Director, NCMA, 6728 Old McLean Village Drive, McLean, VA 22101. There is a $45.00 application fee and a $45.00 exam fee, and both exams are given twice a year.

You should be aware that if you are fortunate enough to finally have the certification hanging on your office wall, that the blood, sweat, and tears are not over, yet. To keep your certification current you must recertify every five years. the recertification program requires CPCM's and CACM's to complete at least 60 hours of approved training every five years.

What's in it for me?

You could be enticed with such benefits as "greater respect," "self-esteem," "professional credibility," and "upward mobility," but the most important benefit is that either program will force your head "out of the sand."

You will be exposed to some entirely different methods and techniques for contract administration and will grasp some excellent tools for more effective contract management.

If you're in this business, why not go for it! □

'Forget all the bad jokes you'

OMAHA

The city i

For sports enthusiasts, college football reigns supreme in the hearts of Nebraskans . . .

Tickets to a University of Nebraska football game are worth a small fortune . . .

Its museums are enjoyed by many . . .

By LCDR S. R. THOMPSON
P. E.; Ga. and La.

• OMAHA, Neb.

The Navy is doing an important job in Omaha, Nebraska. There, the Navy's Civil Engineer Corps is playing a role in our nation's nuclear war planning. Unknown to many, the Navy has two billets in Omaha: one is an exchange billet with the Air Force and the other is a vulnerability engineer on the Joint Strategic Target Planning Staff (JSTPS) which is colocated with the strategic Air Command Headquarters.

Not all unique and important jobs in the CEC are Seabee, Public works, or contracts related, and "Not all CEC jobs are in Podunk Hollow" (See Summer 1982 Issue, Author CDR Steve C. Beuby). It's important to get the word out about little-known interesting jobs in the CEC. Although it's impossible to describe the work of the JSTPS, because of national security reasons, it is possible to tell how the CEC plays a role in our nation's nuclear war planning.

The JSTPS was conceived in the late 1950s and born in 1960. Its mission: to use the existing nuclear capabilities of the United States and its allies to develop a Single Integrated Operational Plan (SIOP) that would strike insurmountable fear in the heart of any nation that would contemplate the destroying of our nation by force.

It is the perception of the effectiveness of this plan to cause unacceptable damage levels to an adversary, whether in preemptive or retaliatory mode, and the national will to use it, that forms the foundation of the mutual assured destruction (MAD) philosophy. It is this very same philosophy which the major nuclear powers rely on even today to insure peace from a nuclear nightmare.

The JSTPS reports directly to the Joint Chiefs of Staff. The "head" of the staff (which is made up of approximately 350 men and women from all the services) is the Director of Strategic Target Planning, also dual hatted as the Commander-in-Chief, Strategic Air Command (CINCSAC)—an Air Force four-star General.

By tradition, and possibly to give a balanced viewpoint in support of the Triad concept, the Deputy Director has always been a Navy Vice Admiral.

Beneath the Deputy Director are two divisions, each run by a flag or general officer.

The National Strategic Target List (NSTL) Division translates the national guidance into specific guidelines that are used to select installations (targets) for the grouping into targeting clusters. From within these clusters, the optimum aimpoint (called the Desired Ground Zero or DGZ) is determined which would satistically achieve at least the minimal level of militarily significant damage.

From this list of aimpoints, the other division, the SIOP Division, performs the assignment of individual weapons to designated targets. It is the fact that the country is target rich and weapons poor that makes the CEC role a vital link in the JSTPS planning chain.

've heard about . . .

A!

is a gem . . .'

The CEC officer is assigned to the Nuclear Weapons Effects Branch of the National Strategic Target List Division and is the principal staff officer responsible for the accuracy of the structural vulnerability descriptive data of targeted military and industrial installations. These data are utilized in concert with weapon data (e.g., weapon yield, accuracy, etc.) to mathematically predict the probability of militarily significant damage.

It is especially critical that this information be accurate, otherwise military objectives may not be met if undersized weapons are assigned to hardened targets. To insure that accurate, up-to-date predictions of target vulnerability are being utilized, the CEC officer is expected to maintain liaison with the intelligence and scientific communities concerned with physical vulnerability (e.g., Central Intelligence Agency, Defense Intelligence Agency, Defense Nuclear Agency, etc., and to recommend, develop and refine damage prediction methods for unusual targeting situations.

It is not unusual for the CEC officer to be tasked with developing backup material which will be utilized to brief the highest levels of military and governmental authority—if not tasked with the briefing presentation itself. "What if. . . ." questions are not unusal and they are bound only by the imagination of the individual asking the question.

As everyone knows, to be a good job, the locale must also be conducive to family fun. Forget all the bad jokes you've heard about Omaha...the city is a gem in the nation's heartland.

The people are open, friendly and staunch supporters of the work JSTPS and SAC are doing.

The city is famous for its unexcelled dining establishments, museum, horse racing and community charitable events which bring outstanding Hollywood talents to entertain.

For sports enthusiatists, college football reigns supreme in the hearts of Nebraskans and tickets to a University of Nebraska football game (played an hour away by car in the State's capitol of Lincoln) are worth a small fortune.

Baseball enthusiasts will enjoy the outstanding minor league play of the Kansas City Royals, as well as that of the annual college Baseball World Series, in the Omaha Stadium.

The weather can be especially hot in the summer and cold in the winter, and snow isn't unheard of at Thanksgiving. But the warmth of Nebraskans clearly make it a desirable locale to rear children or for the bachelor/bachelorette to find his/her "one and only."

What are the the requirements for the job? Preferably a senior LT or LCDR with a mathematical background associated with an engineering or physical science degree. Graduate education in structures or structural dynamics is helpful, as is some rudimentary knowledge in nuclear effects. But the most important ingredient is the desire to learn because few CEC officers can meet all the qualifications.

In fact, it's not unusual for an officer to take six months in becoming sufficiently knowledgeable of the SIOP development process to become a viable, working member of the Staff. Ask about the nuclear weapons/effects related billets at the Defense Nuclear Agency (DNA) in Washington, D.C., Kirkland AFB in New Mexico, or in Mercury, Nevada. Who knows, it just might turn out to be *your* most extraordinary job ever! □

The city is famous for its unexcelled dining establishments . . .

Horse racing is also very popular in Omaha . . .

Baseball enthusiasts enjoy the outstanding minor league play of the Kansas City Royals

situation report

departments

TRIDENT - In October 1980 the Secretary of the Navy selected Kings Bay, Georgia, as the East Coast site for the TRIDENT Submarine Base. The Poseidon squadron from Rota had already been moved in and facilities to support this activity were being constructed. Construction under the supervision of OICC TRIDENT, Kings Bay, began in FY82. The construction program is planned over a ten-year period and is estimated at this time to cost approximately 1.8 billion dollars. Included in the program is a drydock ($134 million), a training facility ($82 million), three refit wharfs ($162.7 million), two explosive handling wharfs ($102.4 million), Industrial Refit Facilities ($102.0 million), Strategic Weapons Facilities ($305 million), and all the other necessary support facilities to have a fully operational base by 1992. OICC TRIDENT is expecting to accomplish approximately $1 billion dollars of construction in FY85 to FY88 in order to meet a limited IOC in December of 1989.

(NAVFAC Code PC-1)

SERVICE CONTRACTS - NAVFAC has developed twenty standard performance work statements (PWSs) for use in contracting facility support functions. These twenty PWSs comply with the requirements of Transmittal Memorandum No. 6 of OMB Circular A-76, which, in addition to its application to commercial activity cost comparison studies, requires that all work statements for existing service contracts (including non-CA conversions) be rewritten before reprocurement to be performance oriented and that a quality assurance plan be developed. These standard PWSs are available through the Engineering Field Divisions.

(NAVFAC Code 10)

FAMILY HOUSING AS A NAVY APPROPRIATION - In furtherance of the policy of the Secretary of Defense to return more responsibility and authority to the Services, legislation has been passed by Congress which discontinues the Family Housing Management Account as a Department of Defense appropriation and establishes separate appropriations for the Army, Navy and Air Force effective with the fiscal year 1983. Instead of a centrally managed DOD program, each of the Services now has the responsibility for administering its own program. Family Housing construction funds remain available for obligations for a five-year period while the Operations and Maintenance Account remains an annual account and expires in one year.

(NAVFAC Code 01A)

Modeling industrial wastewater treatment plants

By **WILLIAM S. MCAVOY**
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and
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P.E., S.C.
Environmental Engineer — NAVFAC

• Charleston, S.C.

A model has been developed to determine optimum operating performance/design parameters for activated wastewater treatment plants receiving industrial wastes. A program for a Hewlett Packard (HP) 41C Calculator has been prepared for the model.

A majority of the larger wastewater treatment facilities receive some quantity of nondomestic or industrial wastes which have attracted attention during the past several years due to the complex nature of the constituents and difficulty associated with treatment.

Additionally, a recent report published by EPA indicated that a large number of the new municipal wastewater treatment facilities do not meet the National Pollutant Discharge Elimination Systems (NPDES) permit requirements as a result of improper initial modeling/design of the plant; and the inability to apply the most efficient operating standards to treat these wastes.

The purpose of this calculator program is to provide the design engineers with a means to check initial design assumptions and to assist plant operators with determining optimum performance parameters.

Modeling Program

One problem associated with wastewater treatment plants receiving industrial wastes is that large fluctuations of the influent characteristics are frequently encountered. Previous experience has indicated that the design engineer should utilize the extended air mode for plants anticipated to receive industrial wastes; however, the model has also been developed to predict operating parameters and design characteristics for the conventional activated sludge process.

Too often, wastewater treatment plants are designed using standard loading criteria which were developed for wastewater treatment plants only receiving domestic wastewater.

Industrial wastewater treatment seems to test the limits of the textbook parameters and has resulted in redesign of many wastewater treatment plants. Also, many operators rely on the Biochemical Oxygen Demand, 5-day test (BOD_5) for performance monitoring.

The problems with this procedure include a 5-day waiting period until results are available and possible interferences from toxic industrial wastes. After the BOD_5 data is available, the operator is required to solve several complicated, time consuming equations in order to properly evaluate the biological system.

A way to evaluate the process based on easily obtainable wastewater influent characteristics in a time efficient manner would be beneficial to operators. The model has been developed utilizing influent data normally available at most wastewater treatment plants on daily basis and with the understanding that the BOD_5 may be estimated by the Chemical Oxygen Demand (COD) test.

The COD may be obtained in a short period of time and represents the biodegradable organics and any industrial wastes which may be chemically oxidized. Once the relationship between the BOD_5 and COD for a particular wastewater treatment plant has been established, an estimate of the most efficient operating parameters can be determined by the program.

The model allows the operator to have the advantage of estimating alterations in operating parameters prior to deterioration of the wastewater treatment plant performance, thus minimizing or eliminating permit violations.

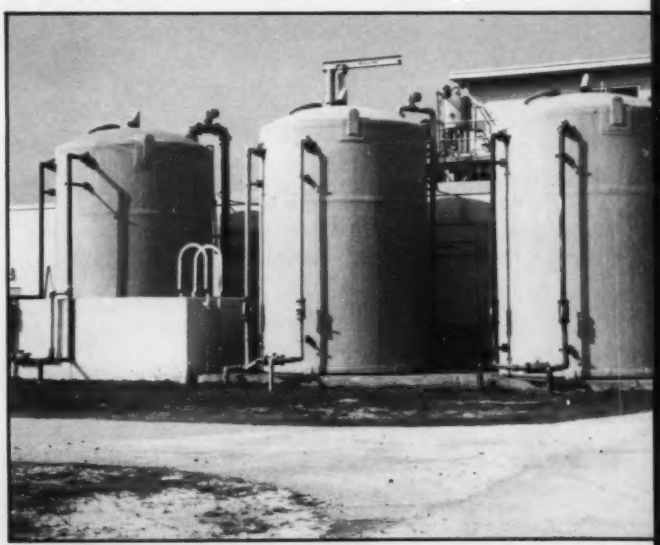
By plotting the trend of the model predictions for the food to microorganism (F/M) ratio, the mean cell residence time (MCRT) and oxygen requirements, the operator can also predict modification for seasonal or operational changes.

These estimated changes would be derived from biokinetic relationships for a specific treatment facility vice textbook domestic wastewater treatment plant operating parameters.

Subsequently, the information available through the model would be the most accurate performance evaluation at any given time of the wastewater treatment system and has the potential for significant operational application.

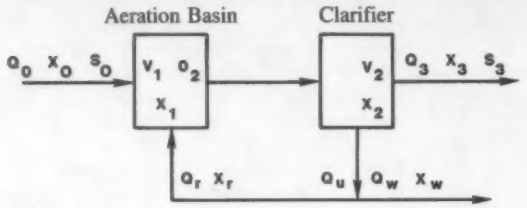
Model Development

The rationale used to develop the treatment of mixed domestic and industrial wastes include the parameters of



Industrial waste holding tanks for segregation of chrome, cyanide, and acid-based wastewaters. Each tank holds one type of wastewater.

importance in the activated sludge system. The reaction composition is shown below and consists of the following:



where

Q_0 = influent flow, MGD

X_0 = influent suspended solids, mg/l

S_0 = influent BOD, mg/l

0_2 = oxygen requirements of aeration system, lbs/day

V_1 = volume of the aeration basin, MG

X_1 = mixed liquor suspended solids, mg/l

Q_r = return sludge flow (RAS), MGD

X_r = return suspended solids (steady state), mg/l

Q_w = waste activated sludge flow, MGD

X_w = waste activated sludge concentration, mg/l

Q_3 = effluent flow, MGD

Q_u = $Q_w + Q_r$, MGD

X_3 = effluent suspended solids, mg/l

S_3 = effluent soluble BOD, mg/l

V_2 = clarifier volume, MG

The rationale includes the assumption that all substrate removal occurs in the aeration basin, the solids in the piping systems are negligible and that the mass of volatile solids is approximately 75% of the total suspended solids.

Secondary clarifier with aeration tank in right background.

The objective is to predict the operating/design parameters necessary to obtain the effluent BOD_5 standard (S_{std}) and the effluent suspended solid standard (X_{std}) for an activated sludge system receiving industrial wastes.

Establish the Relationship

The first requirement is to establish the relationship between the yield observed (Y) and the mean cell residence time (MCRT). Sherrad and Schroeder (1970) used an exponential function for this relationship.

The formula was modified using actual plant data for a facility receiving about 20% industrial wastes. Each plant has a different yield coefficient and is significantly affected by the type of waste to be treated and the unit processes involved with the system.

$$Y = 0.7e^{-0.02590c}$$

where

Y = yield (lbs VSS/Day)

θ_c = mean cell residence time, days

This relationship means that the yield will decrease with increasing MCRTs rather than assuming that yield would remain constant. Correct determination of the yield allows the engineer to design the size of the sludge handling facility and tells the operator how much activated sludge to waste in order to stabilize the mixed liquor concentration in the aeration basin.

The required effluent BOD_5 for an activated sludge system is also a function of the MCRT. Manod (1942) first developed a relationship based on substrate removal and growth kinetics. The following formula, developed by Saunders (1975), has been modified to model a 0.8 MGD wastewater treatment plant receiving about 20% industrial wastes from an aircraft maintenance facility.

$$\theta_c = \frac{(62 - S_3)}{.65\ (S_3)}$$

where

θ_c = mean cell residence time, days

S_3 = soluble effluent BOD_5, mg/l

This kinetic relationship allows the engineer to size the aeration basin based on effluent standards and the operator to determine the MLSS concentration necessary to achieve a given MCRT.

Both relationships must be evaluated together in order to obtain maximum use of this information. The model has the capability to do this as well as provide information about the mixed liquor suspended solids, mean cell residence time, waste activated sludge, aeration basin size, clarifier size, oxygen requirements, and F/M ratio using information about the influent waste strength.

The program can be obtained from Mr. William McAvoy or Mr. Kenneth Chacey, Environmental Branch, Southern Division, Naval Facilities Engineering Command. □

an editorial

departments

By T. C. MURPHY
Professor Emeritus
CECOS

Handshakes versus knuckle-scramblers

Please don't introduce me to any more Marine officers. It's like putting your hand in a motorized vise just as someone pushes the "on" button.

All through two wars, I kept hoping that the next Marine officer I met would have a normal handshake; the law of averages I kept telling myself; but they're all the same. They're **all** knuckle-scramblers. Unsmiling, too. I'll swear the last one I shook hands with was trying to force me to my knees. The next time I see an introduction coming I'm heading for the men's room.

I used to wonder what it was that turned them on so athletically: my looks (mousey) my size (small) my hand (probably clammy) my uniform (Navy)—or could they tell I was a Reserve? Do they get aerobic points?

Or had they just survived a prolonged hand-to-hand combat experience?

Or did they have a bad case of cultural shock induced by being surrounded by a permissive society?

But it wasn't any of those things.

The senior member of an IG inspection team—an Admiral—revealed it to me one day recently. Speaking of a Marine officer he said: "I could tell the minute I shook hands with him that here was a man with a positive outlook. His grip was **strong**. No dead fish; a real grip. I know that here was a young man who was going places."

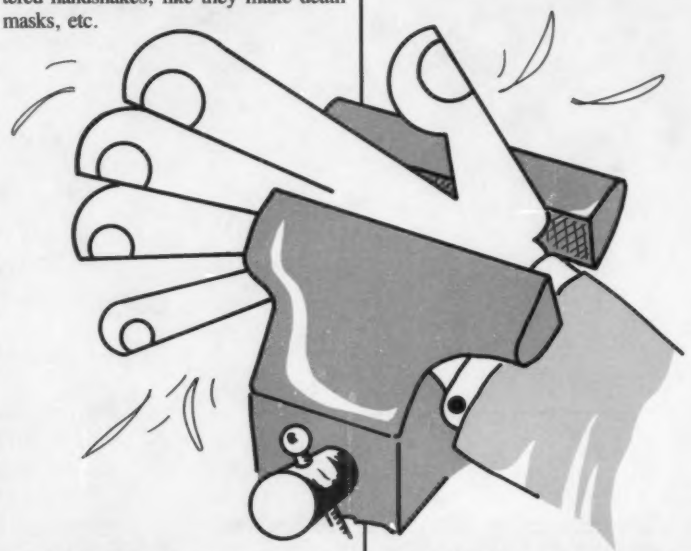
Well, now.

A positive outlook; going places.

So **that's** what they were trying to tell me! I can certify that all the Marine officers I ever shook hands with had very positive outlooks indeed and I **wish** they had been going someplace. Else. When they got through with me I felt that instead of a hand at the end of my right arm I was carrying a bagful of deactivated metacarpals. I should have been awarded the Purple Heart.

But later I began to wonder at the Admiral's remark. Did I and hosts of others **without** vise-like grips have (by definition) negative outlooks?

The more I thought about the Admiral's connection—mind over matter you might say; their minds, my matter-the more I wished I had been able to shake hands with Napoleon (before and after Elba), and Al Capone, and Adolph Hitler. Too bad they don't record metered handshakes, like they make death masks, etc.



In the little town where I grew up there was a fellow my age who wasn't quite right in the head and who never went to school beyond the fourth grade. But everytime I ever talked to him he was happy and smiling and friendly and pleased with the whole world. In fact, his outlook was about as positive as it could be. Being neighbors we never had occasion to shake hands but I feel certain that his grip would have been gentle, despite his positive outlook.

Joe Louis. I'll bet he didn't try to crush the hand he shook. But he certainly was a very positive guy—especially the night he knocked Hitler's super-race representative down twice, and then out, all in two minutes of the first round.

And Generals Lavelle, Turner, and Cole. And Captain L. Patrick Grey. I **know** about their outlooks, but I'm curious about their handshakes. I just can't help wondering, since the Admiral told me about the connection.

And the West Point class of '77*, both the bunch that graduated and the bunch that didn't. Maybe their training in the science of shaking hands was neglected. Not only does handshaking have to be learned, but also, and just as importantly, they must learn how to **interpret** handshakes. Without that, how would they ever be able to sort out all the people they're liable to meet? I mean, since it takes all kinds, as they say, how would they know who is going places and who isn't? In **advance** of their going. It sure would simplify fitness reporting.

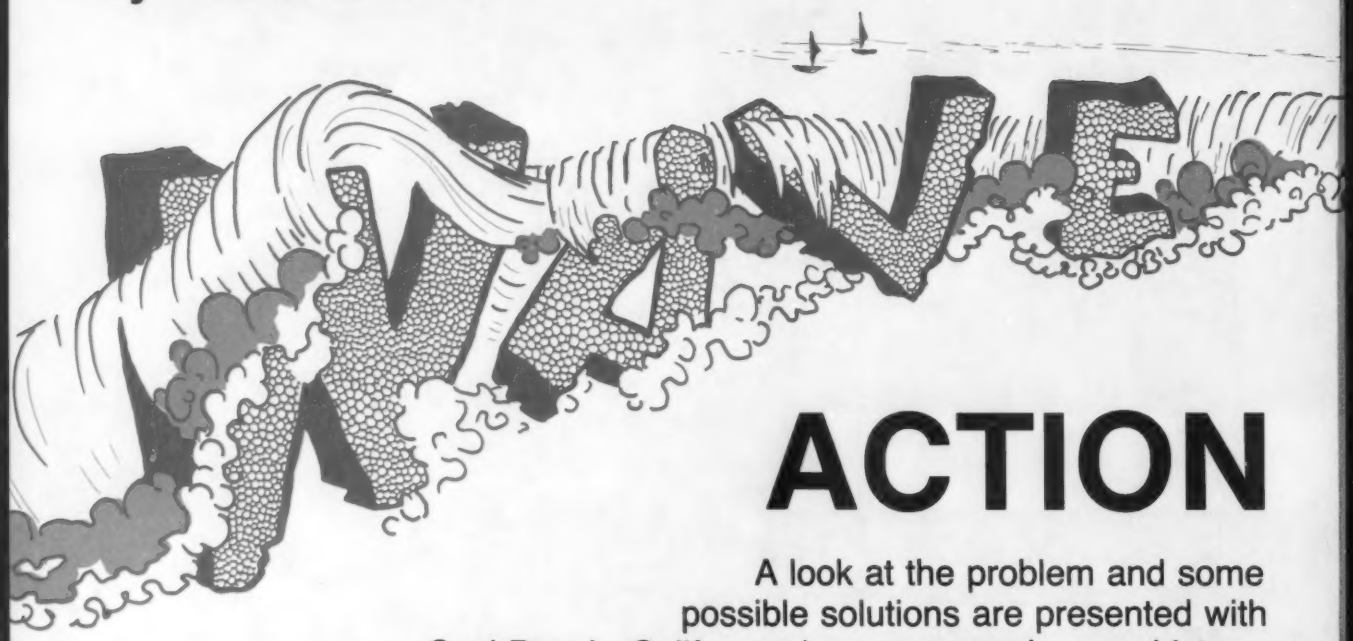
I **know** Archie Bunker has a firm, strong grip because he is so positive about everything and everybody.

But there I go again, confusing myth with reality, fiction with fact. Archie isn't a **real** person; he's a fictional character. Right?

Anyway, I'm sure glad the Admiral explained it to me. I don't think I could have figured it all out by myself. □

**A substantial number was expelled for pot smoking.*

Heavily populated beach fronts are being eroded by severe . . .



ACTION

A look at the problem and some possible solutions are presented with Seal Beach, Calif., used as an example case history.

By PH1 JOHN M. BUFFALO
Geologist and Assistant PAO
RNMCB-16

• Los Alamitos, Calif.

The owner of a beachfront property is seated on the patio looking toward the beach to "his" ocean and shakes his head. He purchased this property initially because of the view of the ocean and the beach, but what he sees alarms, angers, and saddens him. Alarmed that the large and wonderful beach which used to be in front of this home is now nearly nonexistent and the structure in which he resides is becoming threatened by the severe erosion.

The scenario described is a very real problem occurring in the heavily populated beach fronts. The beach has become severely eroded through heavy wave action. Though the problem occurs on any coastal surface it becomes magnified greatly in the more populated areas due to attendant structural damage. Losses may run into the millions of dollars.

A few causes of wave damage will be discussed; some temporary and permanent solutions identified; and some conclusions drawn on the prevention of further damage to populated beaches. The Seal Beach, Calif. site will be used as a representative example of wave action damage and possible methods for the solution of those problems.

Causes of Wave Initiated Erosion

Introduction

The causes of wave action erosion may stem from either natural phenomena or it may be initiated when man, through overbuilding or misuse, alters the beaches and the wave patterns thereby increasing the energy levels exerted upon the beach surface and subsequently increasing the volume of material eroded from that surface. The natural causes, though important, will be discussed here only lightly. The bulk of the discussion will be centered around causes which are affected by man and his actions.

Natural Causes

It must be understood at the outset that anywhere a land surface comes into contact with moving water, there will be some degree of erosion occurring all of the time (Figure 1). Any beach where there is space for what is termed natural wave action has the heaviest erosion occurring along the headland and the beach adjacent where the tidal energy is increased and lateral

currents increase the scouring on the beach (Figure 2). If the headland is small or non-existent and the beach area, if long, is still long, the normal beach lateral currents are in effect; the areas of scour and deposition occur and the beach gets its normal elongated "C" shape (Figure 3).

Severe wave energy may be initiated and transmitted because of tsunamis, submarine seismic activity, and/or submarine landsliding, and though they are important causes of damaging wave erosion, they do not reflect the ongoing problem of wave damage which comes through alterations in the normal wave erosion patterns over a long period of time.

By Wave Action through Man's Action

Man, through his action of inaction, has been responsible for much of the world's damaging beach erosion. He has built and overbuilt, altered river channels, removed sources of silt used to deposit on beaches, and generally abused that part of his environment which borders the sea.

A graphic example of the overbuilding phenomena occurs in Honolulu or Miami where, in an attempt to get the most out of the tourist dollar, the commercial domiciles are built to the beach level cutting off any replacement material from the inland side of the beach. This causes severe erosion when the beach is subjected to extra wave energy and seawalls must be erected to prevent the structures from damage (Figure 4).

Man has also altered beaches by damming and the concrete channeling of stream and river channels thereby eliminating deposition sediment which is normally transmitted to the beaches for self restoration. This action becomes more apparent when the waterway opening is further channeled out by the inclusion of jetties. Without the deposition from this source, beach erosion is not decreased or the beach front restored by natural processes (Figure 5 & 5a).

Man's building of marine terminals and marinas to protect commercial and recreational watercraft has also altered energy patterns and caused severe beach erosion. Problems attendant to marinas have occured in Seal Beach where the addition of jetties and the disruption of a closed natural shoreline by additional

Man assisted damage — a classic case

openings causes the wave energy patterns to again become altered and severe erosion to result.

With the addition of jetties the problem is magnified along the down current side of the shore opening (Figures 6 & 6a). The wave energy becomes intensified during storm situations; this is the case in Seal Beach. Beaches in Southern California are divided into western and southern facing beaches with the southern facing beaches taking extreme damage from any type of wave current alteration.

The Seal Beach site suffered this type of fate during August and September of 1982 when it was hit by storm-generated increases in wave action causing erosion to such a degree to threaten structures (Figure 7).

Repair and Stabilization of Beaches

Introduction

Temporary and permanent repairs, and beach stabilization will be considered with Seal Beach, California, used as the site example because of its close proximity to the author, and because it is a classic case of man-assisted wave damage.

At Seal Beach the problem involved number of agencies. This caused some delay and conflict due to the determination of responsibility for the remedial work to be undertaken on the beach. Worked out that the responsibility for any long-term repairs would be lodged with the Los Angeles District of the U.S. Army corps of Engineers but emergency and temporary repairs handled by local agencies and Reserve Naval

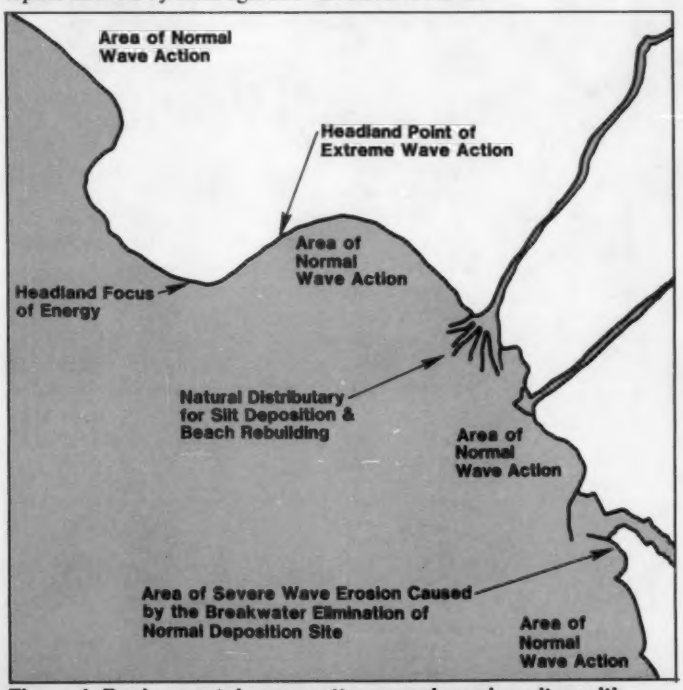

Area of Normal Wave Action
Headland Point of Extreme Wave Action
Area of Normal Wave Action
Headland Focus of Energy
Natural Distributary for Silt Deposition & Beach Rebuilding
Area of Normal Wave Action
Area of Severe Wave Erosion Caused by the Breakwater Elimination of Normal Deposition Site
Area of Normal Wave Action

Figure 1. Basic coastal wave patterns and erosion sites with respect to natural and man-made factors and causes.

Protection of structures imperative

Mobile Construction Battalion Sixteen (RNMCB-16), which is stationed at nearby Armed Forces Reserve Center Los Alamitos.

Temporary and Emergency Repairs

In the case of any disaster, the initial concern of those involved is to insure that there will be no danger to life, further damage to facilities, and increased erosion to the beach itself.

When there is threat to structures along a beach, it is imperative that these structures be protected. The usual manner in which this is done is by placing sand bags along the affected area. When the structures are determined to be secure, then the more lasting, though temporary, repairs may be undertaken.

In the case of Seal Beach, the city provided the sand bag materials and the beginning of stabilization was started by the County of Orange. These temporary repairs, though important, were insufficient to stop the large degree of erosion. Since the area was declared to be a disaster area, this allowed RNMCB-16 to be called in to move the massive amounts of material needed to dress and stabilize the beach.

Heavy equipment brought in by the Seabees was used to move the material from other sections of the beach into the affected area. This material was pressed and dressed to give a packed, less erodable surface. By presenting a dressed face against the wave energy, the affected site is allowed to survive until more permanent repairs could be undertaken (Figure 8).

Stabilization

Stabilization of the beach front is critical for any of the remedies discussed whether they are temporary or permanent. The process of stabilization is the taking of existing beach material, or material brought in and dressing and shaping it in such a manner as to present a less erodable face to the waves. By dressing the slope and reducing the friction face of the beach, it is possible to greatly reduce damage caused by beach and wave current scouring.

It must be remembered that no matter what temporary repairs are undertaken, those repairs are just that, temporary, and all of the work undertaken will be wasted if more permanent repairs are not made within a short period to time.

Permanent Repairs

Work done to temporarily repair the beach must be accompanied by a definite reasonable plan for permanent repairs. The area's permanent repairs requires close coordination between agencies to insure that the plans are properly carried out.

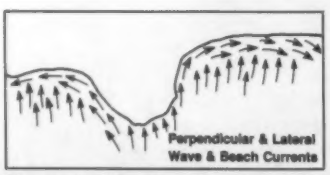


Figure 2. Headland and beach erosion from normal wave action.

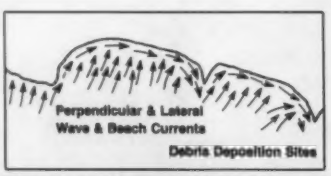


Figure 3. Normal tidal action causing erosion and deposition.

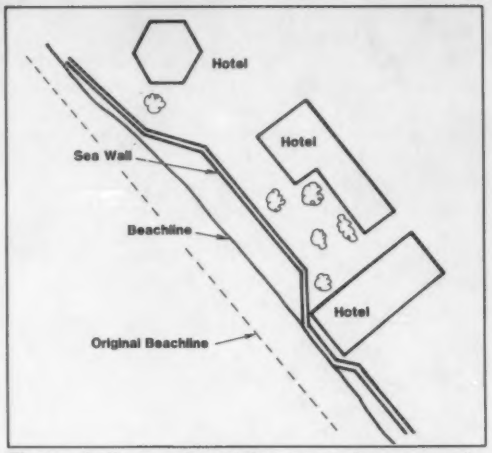


Figure 4. Severe beachfront erosion caused by extreme overbuilding along the beach.

Figure 5. Normal river channel deposition.

Figure 5a. Altered river channel deposition.

Figure 6. Normal beach configuration for erosion and deposition of material.

Figure 6a. Normal beach and wave pattern altered by addition of harbor.

If a breakwater of jetty is involved, it is possible to use additions of one or more rock breaks extending out from the existing breakwater. These rock structures are called groins. The method of groining is attached to the existing breakwaters and are perpendicular to it. This method of attachment is designed to dissipate the flow of energy along the breakwater which in turn disrupts the break and scour pattern of the waves (Figure 9). The key problem with this type of groining is that it is difficult to maintain because it is also subjected to extreme wear

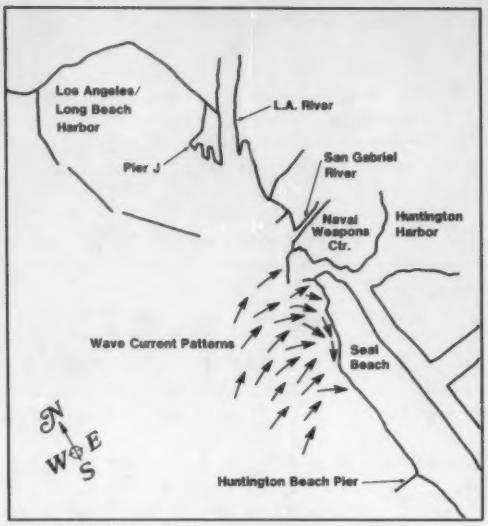


Figure 7. Erosion threatens structures.

There are situations where it is either impossible to make additions to the existing breakwater, or for various other reasons, it is not feasible to install the groins. It may be possible to alter the wave energy patterns by the addition of underwater obstructions placed at strategic locations just offshore of the breaker line. This alteration of wave energy and ocean floor lateral currents reduces the ability of the water to scour and remove debris from the beach area. The most commonly used things are tetrapods - large concrete units which disrupt the energy flow, large irregular boulders, and discarded vehicles (Figure 10).

A third method is the installation of groins, but these groins are projected outward from the beach itself. This type of groin is designed to disrupt the lateral flow of wave energy. The strategically-placed groins cause the water to deposit its load of debris. This reduced run allows the beach to rebuild itself gradually (Figure 11).

The caisson method, or revetment method as it is sometimes called, is another method used to repair damaged land. It is especially useful in areas where the surrounding land is below sea level. A caisson or dam is built just inland from the shoreline at a place where it will not readily be undercut by the wave action.

The caissoning use usually of re-enforced concrete but may be formed from metal and pilings. After the caisson or revetment is in place it is necessary to deposit massive amounts of material behind it to form a levee. This will give a great measure of protection to the land and facilities behind the levee.

The caissoning or revetment method is usually referred to as a composite method of repair because it cannot be used behind itself but must be used in conjunction with another method for increased strength and stability (Figure 12).

The final method is the dredge-fill method of debris restoration. In this method a dredge is installed offshore of the affected area where it is able to pick up

Problem at Seal Beach a classic one

large amounts of loose material from the ocean floor and transfer this material through a series of pipes to the affected area.

Because the material is unconsolidated and includes sands, silts, and fauna it makes it necessary for those who are doing the repair work to properly dress the shoreline so that erosion damage to the new deposits is held to a minimum.

This is what is referred to as a composite method because to insure a reasonable state of permanance, this method must be used in conjunction with another or combination of methods.

The only shortcoming to this method is that the dredging processing must be repeated every ten to fifteen years to insure that the beach maintains its size. In the case of the Seal Beach site, this method was used during the early 1960's and is now required again (Figure 13).

Possible Remedies at Seal Beach

The problem which occurs at Seal Beach is a classic one where man has interferred with the normal shoreline. The inclusion of a breakwater to protect the openings to the U. S. Naval Weapons Center and Huntington Harbor has led to massive erosion on the beaches south of the south jetty.

Because the beach at Seal Beach is a southern facing beach it is doubly hazarded because it is struck by any abnormally high tide which emanates from the Pacific. This increase in wave energy intensity causes an

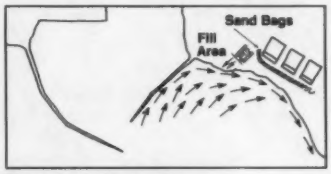


Figure 8. Temporary sandbagging and stabilization filling of affected area.

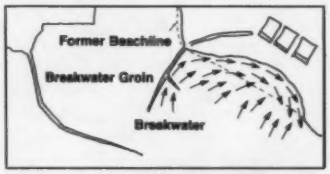


Figure 9. Breakwater groin to slow down wave action which in turn reduces erosion.

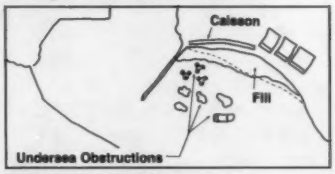


Figure 10. Underwater obstructions in place to deflect some of the wave generated energy.

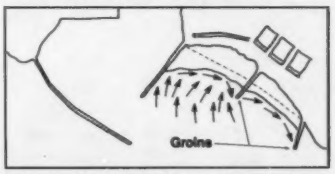


Figure 11. Beach groins to be placed on beach to disrupt the flow of wave energy.

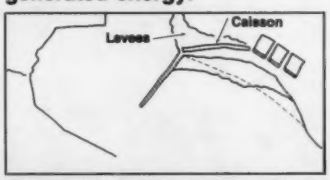


Figure 12. Caisson method of preventing beach front destruction.

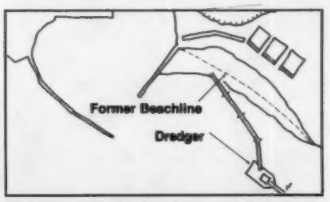


Figure 13. Dredging method of beach front restoration.

The answer: observation & repair

increase in the scouring of the beach and materials are removed from the already unstable beachfront. As mentioned previously in the section on temporary repairs, sandbagging and fill was used to give some temporary stability to the damaged beach and to protect the structures involved.

Temporary repairs on this site were made by the local agencies involved and RNMCB-16, while long-term repairs are to be made by the Army Corps of Engineers. Permanent repairs on this beach have been slowed down by a combination of factors. The first of them is jurisdiction; deciding where emergency and temporary repairs end and where permanent repairs begin. Second, a long term plan was not maintained for this site and since it will require at least two to three of the previously mentioned remedies to give permanent stability to the beach, it will be a while to decide which combination of methods is to be used.

Though conjecture at this point, this author expects that it will be a combination of revetments for below sea level land and facilities, groining from the beach to break the lateral current flow and scour occurring that way, and finally dredge and fill to restore the beach to its former proportions.

The final work on this project has to be a coordinated effort between all agencies involved. It is hoped that whatever method or combination of methods used will be long lasting and will limit the danger and damage to adjacent property and lives.

Update at Seal Beach, Calif. . . .

Since the main body of this monograph was written the coastline of California has been subjected to the worst rains and high tides in many decades. The tides and rains which have hit the Surfside Colony of Seal Beach, California, during the months of January and February have raised havoc for the residents and caused considerable damage to the area.

Tides have averaged from six to eight feet with swells up to twenty feet. This generated sufficient energy to cause severe damage to the area. Also, because only temporary repairs had been completed and not some of the more permanent solutions as mentioned in the paper's main body, the amount of damage was higher than it might have been.

As the protection against the tides consisted of only sandbags and hastily manufactured berms of sand, the remaining beach was quickly eroded leaving the adjacent structures and facilities open to severe damage. With the removal of the berms by wave action, the structures immediately behind the beach were filled with up to three feet of seawater and debris. High tides were spread out over a number of days allowing massive amounts of water and debris to be transported beyond the beachfront structures and innundate the nearby Pacific Coast Highway to a depth of two feet for about a mile of its length.

Adjacent structures such as fishing piers, which had taken the beatings of many storms, were suddenly subjected to severe damage and this has caused concern for their future existence. As of March 1, 1983 the expected damage figures for the beach, structures, and other facilities has amounted to in excess of $15 million, and quite possibly will be much higher if the area is subjected to more severe wave action.

As was stated in the main body of the article, it is imperative that proper protective as well as remedial actions be taken to prevent or at least limit the level of damage which has occurred during the great storms of the winter of 82-83.

JOHN M. BUFFALO

Summary and Conclusions

Summary

When a beach suffers from massive wave-generated damage in a populated area it is incumbent upon those involved to take quick but proper action. Discussed were sandbagging and quick filling to stabilize the beach and protect the structures involved. Some of the causes of wave-generated damage were also discussed with an orientation toward man assisted causes. Finally more permanent remedies were discussed with an emphasis on the Seal Beach site of severe wave damage in California.

Conclusions

There are a number of thoughts to be discussed on the topic of wave-generated damage. Has man in his zeal to build and populate irreparably destoryed the coastlines ability to regenerate itself? Has he the understanding of the wave processes to be able to coexist with the natural forces involved? And, is man able to adjust his environment to prevent massive amounts of damage to structures and property?

In response to these questions at this time man has not totally damaged the coastline beyond all possibility of repair, but it is necessary for him to remain responsive to his environment. By doing this he can coexist peacefully with nature and benefit both.

When the situation does require damage repair it is important that all of the agencies involved act quickly and reasonably, and in close harmony. This coordination may be the difference between permanent remedy of the potentially devastating problems wave erosion may cause and the destruction of valuable coastline and property.

Once temporary repairs have been undertaken, it is important for the agencies to have a reasonable plan for permanent repairs. Because of the nature of wave-generated erosion it is necessary for the agencies, when a permanent plan is decided upon, to include a number of methods for repair. Usually it will take at least two of the methods to give a good permanent solution to the erosion problem.

The Seal Beach site, which was used as an example of this type of damage, is an excellent candidate for multiple repair methods. Because there is no way to eliminate all erosion, it is imperative that the agencies responsible for the beach area maintain post repair and restoration checks on the affected area to insure damage is limited, should a problem occur.

Beach erosion is a problem which has plagued the world for eons.

With proper observation and repair of populated beachfronts, however, the poor man described at the beginning of this discussion will not exist. □

news worth reviewing

departments

Artist's version of container-handling monorail

Monorail to unload Ships at sea

Disneyland hasn't joined the Navy. However, one of its most popular people movers, the monorail, may figure prominently in a new Navy idea for moving 20-ton containers from ships moored in the open sea directly to shore.

The Naval Civil Engineering Laboratory at Port Hueneme, Calif., is developing several concepts for an Advanced Cargo Transfer Facility (ACTF). One of the most promising is the Transway Monorail Container Handling System.

Engineers envision the following operation within 10 years: A caravan of containers, transferred from a containership, will glide to shore down a sloped monorail. The length of the monorail, from 2,500 feet to 10,000 feet, will depend on how closely to shore the ship can be moored safely. A minimum of 50-foot water depth will be required.

If the monorail proves to be an effective method for transferring containers, it will be developed into an operational system. Presently there are no systems that handle containers in the proposed mode. The coal industry uses moving conveyors to transfer coal from shore to ship. Such systems cannot move containers, and are basically permanent facilities which cannot be relocated rapidly.

NMCB-133 wins Peltier Award . . . again!

Naval Mobile Construction Battalion 133, homeported at Gulfport, Miss., has won the 1982 Peltier Award which is given annually by the Society of American Military Engineers (SAME). The award is presented to the most outstanding unit of the active Naval Construction Force. This is the second time in three years that NMCB-133 has won the award reports Ruth Jackson of the PAO there.

Deploying to Europe in March, NMCB-133 hit the ground running and didn't stop until the deployment's final day. Twenty seven projects were undertaken in Rota, Spain, and 24 were completed with no rework.

RADM Zobel called the battalion's upgrading and dedication of Camp Mitchell a "superb achievement."

Pavement Recycling Saves $$$

At present the 170,000 square foot parking lot behind Building 3400 at the Great Lakes Naval Base is receiving a facelift. According to LT M. P. Migliore the OICC, this repavement project, being administered by the Navy's Construction Office at the Great Lakes, Ill., Naval base, is saving the Navy $14,000 in construction costs.

Instead of using the conventional method of pavement replacement involving demolition of the existing pavement, removal and replacement of the base, grading and compaction of the subgrade and application of a hot-mix asphalt base course and surface course, a new cold-mix recycling process was proposed and approved.

This state-of-the-art process involves a pulverizing of the existing asphalt wearing surface and base course and mixing it with the underlying aggregate base to a depth of four inches, injecting the mixture with a CSS-1 emulsion type stabilizer, followed by grading and compacting to achieve base stabilization. Finally, a one one-half inch hot-mix asphaltic wearing course is applied to provide a wearing surface completing the process.

The cold-mix recycling process saved a total of $35,000 over the original design while providing an equally strong product extending the life of the original pavement. Under the Navy's Value Engineering Program the contractor recoups 55% of this savings less administrative expenses, with the Navy realizing the other 45% for a saving of approximately 18% of the contract price. The recycling method has been shown to save from 15-40% over conventional methods.

Joint Reserve Operation Delivers the Goods

A joint operation of Army, Navy, Air Force and Coast Guard Reservists delivered 62 pieces of construction equipment from Davisville, Rhode Island to Solomons, Md. The equipment is being used by Naval Reserve Seabees on construction training projects at the Naval Recreation Center, Solomons, Md.

The operation Blackjack '83, combined reserve training with realistic testing of mobilization capabilities. The transportation phase of Blackjack '83 brought together reserve units that would have to work together in event of mobilization.

At Solomons, the equipment will be used by Naval Reserve Seabees of Reserve Naval Mobile Construction Battalion Thirteen, Peekskill, N.Y. for a variety of construction, renovation and rehabilitation projects.

The operation is being coordinated by the Twenty-First Reserve Naval Construction Regiment, Davisville, R.I., under the command of Captain L. M. Seigel.

Equipment being moved from the staging area to the ramp of the USS Boulder.

We've worked out a simple solution . . .

Why not recycle used oils?

By ROBERT CASTELLUCCI
Environmental Engineer
Environmental Engineering Division
NAVFAC

• Alexandria, Va.

Did you know that a gallon of used lubricating oil has the same energy value as Number 4 fuel oil? Did you know that used solvents can easily be reused for secondary purposes? Did you know that certain synthetic used oils can be returned to the manufacturer for credit? And, did you know that recycling used petroleum products could yield substantial revenues for your activity that could be used for non-appropriated morale and welfare activities . . up to $2 million per year?

The Navy purchases and uses a broad range of petroleum and related products each year, a portion of which may eventually become available for recycling. Unfortunately, the fate of most used oils and solvents in the Navy involves disposition by contract where the Navy gives away or pays to have used oils and solvents removed.

This still occurs despite the fact that nearly 5-13% of the shoreside demand for natural gas, liquified petroleum gases, and fuel oils could be met by recycling Navy used petroleum products. In terms of heating value, this could represent a dollar value of nearly $70 million per year.

Given this potential value of used petroleum products, why then doesn't the Navy initiate programs to recycle used oils? The answer is simple . . . because it is easier not to. But the Naval Facilities Engineering Command (NAVFAC), the Navy's program manager for used oil, has undertaken significant efforts to turn that excuse around.

In the Navy, the key to successful used oil recycling programs is that the programs must first be easier to implement than those they are replacing. Secondly, the recycling program must provide incentives in the form of tangible economic benefits to sustain the program as a viable activity asset.

A successful program must . . .

Be easier to implement than its predecessor

Finally, the program must not interfere with the performance of the activity mission.

These "real world" requirements are the basis for NAVFAC's efforts to develop practicable recycling programs.

Specifically, NAVFAC's efforts in the Used Oil Management Program include:

- Development of baseline used oil and solvent segregation and management procedures,
- Development of site specific used oil/solvent management plans, and
- Coordination with DOD on used oil and solvent recycling incentives.

Baseline Management Procedures — The first effort, which is being accomplished through a contract with RECON Systems, Inc., aims at establishing simple and cost effective procedures for segregating and recycling used petroleum and related products. The importance of segregating used petroleum products, as a way of maintaining their recyclable value, has long been understood.

Uncontrolled mixing of used oil products such as synthetics, solvents, lubricating oils and fuels yields waste oil slops with little economic value. Moreover, because waste oil slops are not susceptible to recycling, they become, by definition, hazardous wastes.

What has not been understood clearly, however, is the economic relationship between segregation of used petroleum products and the subsequent benefits and costs associated with product segregation.

Through the work of RECON Systems, Inc., this question is being answered. Specifically, RECON has identified six used petroleum product groups that can be used as a basis for segregating all Navy used petroleum and related products. These groups represent the simplest, most economical method of segregating used oils and solvents. The six groups consist of a synthetic base/natural product group, a fuels group (flashpoint greater than 140°F), a secondary fuels group (flashpoint less than 140°F), a halogenated hydrocarbon group, a petroleum base lubricating oils group, and a disposal group.

Site Specific Studies — Concurrent with the development of this baseline information, NAVFAC is sponsoring site specific used oil management studies at major Navy installations. The purpose of these studies is to evaluate

an activity's potential for used oil and solvent recycling and then identify recycling programs and management procedures commensurate with the degree of recycling recommended.

Norfolk, Va., generate nearly 1.5 million gallons/year of contaminated fuels and "waste oils" as a result of ship bilge dewatering and contaminated fuel off-loading procedures.

A successful program must . . .

Be economically beneficial

The used oil studies consist of four major areas: source inventory, segregation analyses, economic analyses, and management plan development. (The work accomplished by RECON Systems, Inc. will be used in the segregation and economic analyses portion of these studies.)

The studies are conducted in coordination with key activity personnel and COMNAVBASE staff representatives. These "Ad Hoc" committees form the basis for review and approval of all used oil and solvent recycling programs.

Used oil studies are underway in Norfolk, Va.; Pensacola, Fla.; and Portsmouth, N.H. Early results (35%) from Pensacola and Norfolk studies indicate yearly savings of $390K and $277K respectively from direct fuel savings and revenues generated from the sale of used oils and solvents through DLA.

Incentives — Having saved the best for the last . . . a few words about the importance of incentives in the used oil/solvent management program.

Activity acceptance of a used oil/solvent recycling program depends largely on how easily implementable that program is. By avoiding complex management schemes and costly equipment investments, activity used oil/solvent recycling programs can be attractive. However, sustaining the used oil/solvent recycling program as a viable activity asset requires incentives in the form of direct economic benefits to that activity.

Economic incentives already play an important role in Navy fuel reclamation programs. Each year, Naval Supply Center fuel reclamation facilities reclaim and sell thousands of gallons of fuel oil reclaimed (FOR) to Public Works Departments at substantial savings over the regular price of virgin fuel.

For example, ships at Naval Station,

These contaminated fuels and waste oils are transferred to the Naval Supply Center reclamation facility at Craney Island where they are reclaimed and subsequently sold to the Public Works Center for approximately $.33/gal. savings over virgin boiler fuel oil. (Price comparison with Number 6 fuel oil at $.91/gal.). For Public Works Departments fortunate to have access to FOR, substantial savings in virgin fuel procurements can be realized.

Unlike FOR, which has fuel quality characteristics similar to Number 2 fuel oil and originates from ships, shore generated used oils consist primarily of petroleum based lubricating oils, hydraulic fluids, metal working fluids, insulating fluids and solvents, and originate from automotive and/or industrially based operations.

Until recently, there has been little, if any, incentive to recycle these used petroleum products. Their characteristically low volumes (when compared to ship generated contaminated fuels and oils) and questioned value as a boiler fuel have resulted in the general practice of paying "waste oil haulers" to remove this seemingly valueless product. Yet, studies have shown that when properly segregated, petroleum based used lubricating oils provide an excellent energy fuel and compare well with Number 4 fuel oil.

Similarly, used solvents are conducive to recycling through proper segregation and application of secondary use management procedures. Many synthetic used oils can be returned to their manufacturer for credit. The point is that shore based used oils and solvents **do** have a value. With the right incentives, these patently valueless waste products could become an activity resource.

A recent enactment by Congress should provide just the incentive needed. The provisions of the Military Construction Codification Act, P.L. 97-214 of July 12 1982, permits the transfer of proceeds from the sale of "recycled products" to a non-appropriated morale and welfare account of the installation . . . up to $2 million per year.

Briefly, here's how an activity would benefit by recycling used oils and solvents under this new law: The activity implements a used oil/solvent recycling program that generates $100,000/year in revenue through sales by the DLA.

After covering the expenses incurred by the recycling program (i.e., collection, segregation, labeling, operation and maintenance), the activity would realize perhaps $80,000. Then, depending on activity requirements, the revenues could be used to fund pollution abatement or energy saving projects or used to establish a non-appropriated morale and welfare account that could accrue funds up to $2 million per year.

Moreover, a balance of $2 million from this account can be carried over from year to year. (This example assumes 200,000 gallons/year of segregated used oils and solvents sold through DLA at $.50/gal.).

A successful program must . . .

Not be a hindrance to activity mission

NAVFAC is working closely with DOD on the implementing policy and guidelines that will revise existing DOD directives on recycling programs based on the provisions of this new law. Such guidelines will form the basis for recycling programs for all solid waste materials. But clearly, the right incentives are now in place to initiate practical used oil/solvent recycling programs throughout the Navy. □

Proposed training centers

When energy efficiency and solar are of prime importance . . .

By CDR J. J. EWERS, CEC, USNR-R
AIA, Ariz., N. C., NCARB
Naval Reserve Readiness Command, Region Seven
• Charlotte, N. C.

The purpose of the design of Naval and Marine Corps training centers is twofold: First, to provide a design that is energy efficient, has a passive solar contribution, is in accordance with Navy space criteria, and has little or no premium in cost above the average; and second, to facilitate the traditional Navy design process for new centers.

A problem with the design process usually occurs duing the predesign conference with the civilian architect-engineer that is costly in terms of design quality, managment, and service of the civilian architect-engineer.

The military representatives which include facilities officers from the Chief of Naval Reserve, Commandant of the Marine Corps, Naval Facilities Engineering Command, and Naval Reserve Readiness Command, and the training center commanding officers, often have conflicting designs. This invariably hinders the design process and also reduces the quality of the architect-engineer's service.

The solution to the problem is to develop a definitive design, and have it reviewed and approved by the military before the predesign conference. To show how this might work, the design of a proposed Naval and Marine Corps Reserve Center at Charlotte, North Carolina, has been chosen as an example.

Site

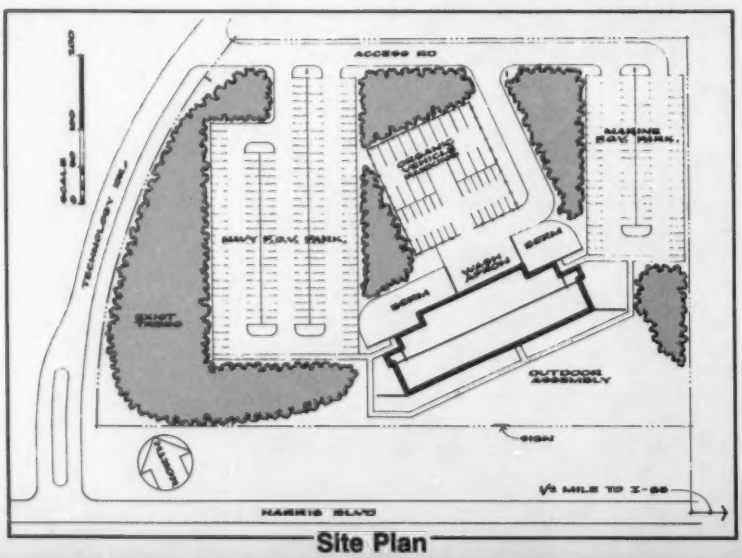
The proposed site for the training center is located in a prominent research park close to an interstate highway and a state university. The land is at the crest of a south facing hill, has existing tree cover, and is approximately nine acres in area.

Criteria

The functional requirements and space criteria, used in developing the subject design, were obtained from the responsible commands. Of primary importance, were the Chief of Naval Reserve space analysis form and functional diagram, which are enclosed.

Design

The proposed training center design is a two-level building with the lower level sunk into the south facing hill. Soil berms are placed against the north walls of the upper level. The south wall has two levels and a clerestory exposed for solar collection. The design drawings, which are schematic in detail, are enclosed.



Site Plan

Construction

The construction materials of the proposed training center design are as listed for the following components:

Foundation: Poured concrete
Frame: Structural steel
Roof: Coated (white) polyurethane foam on steel deck
Floors: Poured concrete on steel deck; Poured concrete on grade.
Below Grade Walls: Polystyrene rigid insulation over poured concrete.
Exposed Walls: Fiber reinforced plaster over polystyrene rigid insulation over exterior gypsum sheathing over steel studs and fiberglass batt insulation over solid brick masonry.
Thermal Storage Walls: Solid brick masonry
Solar Windows: Glass block
Entrance Fronts: Aluminum frame with insulated glass
Exterior Passage Doors: Insulated metal
Vehicle Doors: Insulated metal roll-up
Wall Louvers: Aluminum with dampers

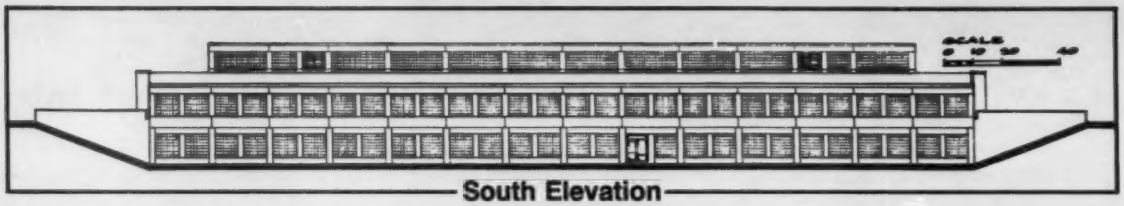
Solar Heating

The passive solar contribution of the subject design is provided by a direct gain system with south facing solar windows, and interior concrete floor and solid brick masonry wall thermal storage. The solar heating performance estimate was calculated with the "Common — Basis" procedure developed by the Los Alamos Scientific Laboratory.

Energy Conservation

In addition to its passive solar heating contribution, the subject design provides energy conservation with the following features.

Solar Cooling: The high clerestory space permits hot air to rise from the lower space and be exhausted.
Earth Shelter: The below grade and bermed-wall surfaces are sheltered from exterior temperature extremes. This reduces winter heat loss and summer heat gain.



South Elevation

Energy Zones: The separation of joint use, Navy, Marine, active and unit spaces provides separate energy zones which permit reduced energy use in spaces not occupied.

Natural Lighting: The daylight from solar windows reduces energy use required by artificial illumination.

Orientation: The elongated east/west building axis and limitation of openings in the east and west walls reduce summer heat gain.

Well Water Heat Pump: The constant temperature well water reduces the energy use required for space heating and cooling.

Consolidated Plan: The consolidation of the vehicle maintenance and main building spaces, reduces exposed wall surfaces, summer heat gain, and winter heat loss.

Security

The inclusion of a diesel generator and fuel oil storage permits the proposed training center to remain in operation in the event of electrical service interruption by the local utility company. The well provided for the heat pump system also provides an alternate supply of fresh water.

Review

The proposed training center design was submitted to the facilities officers at Chief of Naval Reserve, Commandant of the Marine Corps, Naval Reserve Readiness Command Region Seven, and 4th Marine Division, and the commanding officers at Naval and Marine Corps Reserve Center, Charlotte, N. C., for review and comments.

The returned comments were entirely objective and constructive. As expected, some comments were in conflict. Other comments contained recommendations which require the submittal, by the responsible command, and the approval of Chief of Naval Reserve, of a Basic Facilities Requirement (BFR) request, for their incorporation in the revised design.

The returned comments and recommendations are summarized in the following categories.

Affirmations:

(1) Passive solar and energy conservation features
(2) Common active and unit administration spaces
(3) Separate Navy and Marine Corps entrances

Revisions:

(1) Combine Navy and Marine Corps entrances
(2) Provide exterior access to mechanical spaces
(3) Use open office dividers instead of partitions in unit administration spaces
(4) Provide vehicular access to storage spaces
(5) Combine Navy and Marine P.O.V. parking areas
(6) Provide separate Navy and Marine organic vehicle parking areas
(7) Provide separate Navy and Marine unit locker rooms
(8) Provide vehicle maintenance space in separate and detached building
(9) Provide drill deck entrance space to Armory
(10) Combine Marine active and unit administration spaces

Additions:

(1) Provide separate space for TELCOMSTA unit which would include radio transmitting and receiving facilities
(2) Provide separate space for career couseling
(3) Provide separate space for classifiers office
(4) Provide additional space for separate storage and rear projection rooms at multi-media room
(5) Provide separate space for damage control trainer and locker
(6) Provide separate space for cargo handling battalion shop and shed
(7) Provide additional Marine Corps space as required by "Medium Center" criteria, which includes separate space for battalion headquarters

Deletions:

(1) Delete the rifle range

Conclusions:

Evaluation of the review comments has provided some predictable conclusions. As expected, the subject design will require revisions. Before this revision can be satisfactorily done, command action will be required in several recommendations. Conflicting review comments will require resolution by the senior commands.

Recommendations involving a BFR request will require submittal and approval by the responsible commands. After the required command action has been done, it will be possible to revise the subject design in accordance with the approved review comments, and retain most of the energy conservation and passive solar features.

As a result of the evaluation, the following recommendations are suggested concerning the definitive design of the proposed Naval and Marine Corps Reserve Center at Charlotte, North Carolina.

(1) Incorporate the approved review comments in a revised design, and resubmit it for final review and comments.
(2) Submit the revised design and final review comments to Southern Division, Naval Facilities Engineering Command, for use during the predesign and preliminary phases of the project design contract with the civilian architect — engineer.

These recommendations would improve the design input of the responsible commands, the design contract management of SOUTHDIV, and the design service of the civilian architect-engineer. □

reader's comments/questions

departments

Tell us more, more, more . . .

The first time I have seen Navy Civil Engineer and I read every article in your Fall 1982 issue. Fantastic! "Speaking from topside" turned me on, for RADM Conner had guts enough to let, even to expect his subordinates to mess up now and then, for he knows the best ones learn from mistakes, and that they wouldn't be what I call Seabee officers if they didn't do most things right the first time.

I am an Education Specialist who works with CMs, EOs, and UTs who put out exams and Rate Training Manuals for the Navy. My work is always with the tops in the enlisted ranks; your quarterly is my first exposure to what CECOS think and do.

I am still learning and defining nomenclature from Lucy Bottomley's stubborn problem and bold solution, but then one of my five degrees is not in Engineering; none are. And I'll always tune in to "advice of counsel," for I got my LLB by going to night school. I used to teach French at Vanderbilt University, so what LCDR George N Eustace had to say about "Minicomputer's useful or?" appealed to the teacher within me. Can William Pierpoint's Intregal Lighting Switches work in homes, especially mine, in which I can't decide where to put this or that?

I was married to an artist so I appreciate design and layout, Your cover caught my eye and made me curious about the rest of your quarterly. I look for photo arrangement and freshness of each page; the artwork always fit in with the prose.

Kudos to your treatment of women. Did anyone ever tell you, Editor, you look like Jimmy Carter in that photo on page 17? I envy your full head of hair.

I feel a mite prouder of what I do when I see the fine job you, your staff, and you contributors do.

Thanks,
L. Timmer
Pensacola, Fla.

Thank you for your thoughtful letter. Just for saying so many nice things, were putting your letter first so that everyone mentioned can see their name immediately. We will continue to try to the best of out ability to please you and the readership, and at this point I' d like to get in a plug. The magazine can only be as good as the quality of the articles and photos will allow us to be. And since all of our material is contributed (no budget to buy it and no staff to do assigments) we encourage all talented writers to consider sending their next article about subjects related to the CEC, Seabees or NAVFAC. Your letter made our day in spite of the remark about hair and President Carter. Thank You L. Timmer!

The straight scoop on rapid runway repair

Although the opinions expressed in "NCF tackles the three 'Rs', which appeared in the fall 1982 edition of the *Navy Civil Engineer,* are unique, they are based on incorrect conclusions resulting from inaccurate premises. Since the articles appears to be aimed at readers who are not knowledgeable about the Navy's rapid runway repair program, it can only serve as a source of misinformation for those readers. A knowledgeable reader will detect the incorrect information early in the article.

Most of the article's misinformation seems to originate from apparent confusion or misunderstanding about the Air Force's bomb damage repair program and the purpose of the ABFC P36 rapid runway repair component. Consequently, as a result of fundamental errors, the article illustrated the stopped clock phenomenon. This is, a stopped clock, while useless for timekeeping, has the correct time twice a day. Analogously, the article is sporadically accurate but quite inaccurate overall.

Sincerely,
CDR Robert A. Taylor
NAVFACHQ

Thank you CDR Taylor for taking the time to submit such a complete letter of explanation of this program and critique of EACS Timothy Buckley's article. Space prohibits us from printing the entire letter (approximately 900 words), but we noted that you had a copy routed to Buckley so if he' d like to reply we'll look forward to hearing from him. Thank you for your interest!

General shares a priceless story

A neighbor in Carl Vinson Hall brings me your magazine which I enjoy reading.

I've enclosed a couple things which may be of interest.

This story may interest you.

When the first engineers were graduated from a civilian college (either Warwich or Van Renssaliar), they hoped to get a degree, but the college people questioned their educational accomplishments. There were not learned in theology, the Latin or the Greek. But the college Dean finally gave in. Then "what to call it" was the question. It was finally decided to call it "Civil Engineer" to differentiate them from West Point graduates.

Several years ago when I spoke at the British Army Engineer School, I was introduced as a "Civil Engineer." After the talk the Commandant said, "Old Chap, aren't all engineers in America **civil**?

Gen. Bruce C. Clarke
McLean, VA 22101

Your letter was placed last on purpose, General, because we thought it provided just the right kind of levity to end this page. Thank you for sharing this gem of a story with us and our readership!

Got a question, comment, . . . or complaint?
The Navy Civil Engineer welcomes your letters or cards. Send to Editor, CECOS, Code 20M, Port Hueneme, CA 93043.

* **ENS John P. Oliver III**
BSCE/Union College
to Dam Neck, Va.

† **ENS Peter J. Allen**
BSCE/New Hampshire U.
to Gulfport, Miss.

† **ENS Peter M. Arn**
BSCE/U. of Santa Clara
to Port Hueneme, Calif.

LT Hagop A. Avedissian
BME/City Coll. of N.Y.
to Keflavik, Iceland

LT Clifford C. Baker
BSME,BSNE/UCB
to Jacksonville, Fla.

LT Charles G. Batt
BSME/USNA
to Bremerton, Wash.

ENS Dennis D. Bills
M.Arch/U. of Utah
to Pearl Harbor, Hawaii

ENS B. Wayne Boyte
BSEE/Tenn. Tech.
to Williamsburg, VA.

• **LT Patrick A. Brady**
BS/USNA
to Annapolis, Md.

LT Joseph C. Britain
BS Chem./USNA
to Yuma, Ariz.

41 graduate Officers School

Forty-one new officers joined the ranks of the U.S. Navy's Civil Engineer Corps on December 17, 1982 upon graduation from the Naval School, Civil Engineer Corps Officers, Port Hueneme, Calif., and have accepted assignments all over the world.

The class, Number 165, completed eight weeks of specialized training pertinent to the Navy's needs for shore installation engineering, public works management, and Seabee operations.

Six graduated with honors: ENS John P. Oliver III was the Outstanding Graduate. Five graduated with Distinction: LT Patrick A. Brady, ENS Francis P. Castaldo, ENS Bruce W. Dudley, ENS Herve M. Kopciak, and LT Gregory A. Wilderman.

ENS Oliver's photograph is indicated by (*). Students graduating with Distinction are indicated by (•) and those entering Seabee duty by (†).

LT Felix R. Burns
MCE/Maryland U.
to Lakehurst, N.J.

ENS James J. Burns
BSCE/Ohio State
to Gulfport, Miss.

† **ENS Robert M. Carr**
BSCE/Cincinnati U.
to Port Hueneme, Calif.

•† **ENS Francis P. Castaldo**
BSCE/SUNY at Buffalo
to Port Hueneme, Calif.

LTJG Christopher K. Coles
MS/U. of Calif.
to Subic Bay, R.P.

ENS Richard J. Dieffenbach
BSCE/Kentucky U.
to Orlando, Fla.

LT Michael P. Doyle
BSME/USNA
to Norfolk, Va.

•† **ENS Bruce W. Dudley**
BSME/USNA
to Port Hueneme, Calif.

LT David M. Emanuel
BSME/Southern U.
to Iwakuni, Japan

ENS Philip F. Ham
BS Chem.Eng./Maine U.
to Patuxent River, Md.

ENS Thomas F. Herring
BSCE/St. Martin's Coll.
to Sigonella, Italy

ENS David A. Jarrell
BSEE/Ohio State
to Crane, Ind.

ENS Dewayne E. Jenkins
BSEE/Tenn. Tech.
to Pensacola, Fla.

• **ENS Herve M. Kopciak**
BSCE/N.J. Inst. of Tech.
to Sigonella, Italy

† **LTJG Francis E. Luttazi**
MSCE/Cornell
to Port Hueneme, Calif.

ENS David P. Lysak
BSCE/Univ. of New Haven
to Subic Bay, R.P.

ENS Stephen J. Markey
BSCE/SUNY at Buffalo
to South Weymouth, Mass.

† **ENS Bruce W. Matthelse**
BCE/Delaware U.
to San Diego, Calif.

ENS Moya L. McKeehan
BSE/Montana State
to Guam, M.I.

ENS Leo D. McKinley
BSCE/Wash. State
to Camp Pendleton, Calif.

ENS Everette L. Miller III
BS Chem.Eng./Illinois U.
to San Diego, Calif.

LT Carl R. Moore
BSOE/USNA
to Washington, D.C.

ENS David K. Nickerson
BCE/Georgia Tech.
to Charleston, S.C.

LT Stuart E. Perritt
BSCE/The Citadel
to Jacksonville, Fla.

ENS R. Martin Pondelick
BE/Stevens Tech.
to Misawa, Japan

ENS Brian J. Richardson
BSCE/Cal. Poly.
to Guam, M.I.

† **ENS Scott E. Robinson**
BSE/Michigan U.
to Gulfport, Miss.

ENS Richard E. Root
BSME/Kansas State
to Washington, D.C.

ENS Michael P. Savage
BSCE/Univ. of Lowell
to South Weymouth, Mass.

• **LT Gregory A. Wilderman**
MS Envir.Eng./Wash. U.
to Subic Bay, R.P.

ENS Thomas J. Yates
BSCE/SUNY at Buffalo
to Lakehurst, N.J.

Moments in history

Roosevelt was president -
America was involved in WWII -
Seabees celebrated first birthday -
First major allied victory at Stalingrad -
Seabees help attack beachhead at Sicily, and

. . . it happened 40 years ago

The movie 'Fighting Seabees' was being filmed

By Julie F. Streets

The year is 1943. The scene is a tropical island somewhere in the Pacific. The beach seems deserted, but are there really thousands of soldiers of the Rising Sun hidden in the lush undergrowth and carefully watching the approaching American amphibious landing craft? As the small boats crash over the surf their bows are suddenly lowered. In a flash the ominous silence is broken by Seabee spilling tumultuously onto the shore from the landing craft and rushing for cover! As quickly as the fervor of the Seabees assault began, it ends when a piercing cry is heard from the hidden depths of the jungle, "Cut and print!" Another scene from the motion picture, "The Fighting Seabees," has been successfully completed.

Many of you have probably seen this World War II epic motion picture starring John Wayne, Dennis O'Keefe, and Susan Hayward. Did you know, though, that a large portion of the scenes were filmed in 1943 at the Advanced Base Depot, Port Hueneme, Calif., forerunner of the Construction Battalion Center, and at Point Mugu, Calif.? Did you know that the cast also included thousands of men from Construction Battalions and Acorn units undergoing training and staging at the Center?

In the spring of 1943 the idea for such a movie was conceived during a conversation between Admiral Ben Moreell, Chief of the Bureau of Yards and Docks, and Herbert Yates, head of Republic Pictures. Mr. Yates was so impressed with Admiral Moreell's account of Seabee construction and fighting exploits that he requested and received permission to make the film.

All details for the use of the Center and its men during the filming were worked out between Captain Needham, Lieutenant Commander Hunter, and Albert Cohen, producer of "The Fighting Seebees," in August of 1943.

Thus it was with great excitement that the Seabees of the Advanced Base Depot greeted the famous cast and crew when they arrived in Port Hueneme on October 12. The visitors were housed in the Military Training Area and picture shooting began almost immediately. Seabees performed for the cameramen of Republic Pictures by simulating loading activities and embarkation on a ship leaving for the Pacific combat zone. Following this, they played the part of Seabee battalions returning from the battle area by unloadng and disembarking from the same ship. Also caught on film were scenes of Seabee drills, parades, and training exercises.

In 1943, John Wayne filmed the film "The Fighting Seabees," a movie which honored the courageous efforts of the Seabees during World War II. He poses with (from left) LCDR Jerome N. Lawler, Co-star Dennis O'Keefe, RADM Lewis B. Combs, and Captain Henry P. Needham.

When the scenes filmed around the Center were completed, the movie crew, actors, and Seabee extras moved to Point Mugu. There a large outdoor set transformed the beach into a tropical paradise where everyone participated in the beach landing sequences of the film.

On January 14, 1944 the world premiere of "The Fighting Seabees" was held simultaneously at seven Seabee camps across the country. The Center's premiere showing drew a record crowd to its two theaters. Ten thousand Seabees, with the hope of seeing themselves immortalized on the "silver screen," stood in line for hours to gain admittance.

Today it is not quite so difficult to view "The Fighting Seabees." Old movie and Station history enthusiasts will be pleased to know that it is still occasionally aired on the late, late show. It is also shown to newly recruited officers at the Naval School, Civil Engineer Corps Officers, Port Hueneme, as part of their training. So if you should happen to find it playing on your television set, be sure to tune in for some rare glimpses of the Construction Battalion Center and its fighting Seabees of World War II. And remember . . . it happened 40 years ago.